Series 1947, No. 3

Issued February 1958

SOIL SURVEY

Madison County Alabama

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES
ALABAMA AGRICULTURAL EXPERIMENT STATION
TENNESSEE VALLEY AUTHORITY

How to Use THE SOIL SURVEY REPORT

THE SOIL SURVEY of Madison County was made to find out the nature and extent of each kind of soil. Soil scientists walked across the fields and through the woodlands. They examined surface soils and subsoils; measured slopes with a hand level; looked closely at the lay of the land; and watched for differences in the crops, weeds, brush, or trees that were growing on the different soils. Each soil scientist carried a photograph made from an airplane that flew directly overhead, and on it he plotted boundaries of the soils. He placed a symbol in each area to tell what kind of soil he saw there.

This report contains a description of each soil and statements about what that soil will do under different kinds of use and treatment. A soil map of the county is in the back of the report.

Find your farm on the map

Look at the soil map at the back of the report. It shows the main roads and streams and several place names. Locate your farm on the Index to Map Sheets. Note the large red number in the rectangle and turn to the map sheet bearing that number. Then, use roads or other landmarks to find the limits of your farm.

Each kind of soil is marked on the map with a symbol, and all soils marked with the same symbol are of the same kind. You may, for example, find a symbol Hz marked on some of the soil on your farm. To find the name of the soil so marked, look at the map legend, a separate sheet giving the names and symbols for all the soils, and find Hz. The legend shows that this soil is Huntington silt loam.

Suppose you have found Huntington silt loam (Hz) on your farm. How should this soil be used? What does it need to control runoff and erosion? How much will it produce? These questions are answered in the report.

Huntington silt loam and all of the other soils mapped in Madison County are described in the section Soil Series, Types, and Phases. After you have read about the Huntington soil, you will want to know how much it can produce. For this information, turn to table 8 in the section Use and Management of Soils. This table gives expected yields under two levels of management—the management commonly practiced, and better management. You will notice that yields of most crops will increase on this soil if improved management is used.

What should be done to take care of the soil and get the better yields given in table 8? The answer to this is found by first noting that Huntington silt loam is in management group 1, and then by reading the information about the soils that are in group 1.

Management group 1 consists of Huntington silt loam and several other soils, all of which need about the same kind of management. Read about the ordinary management needed to get the yields given in columns A of table 8, and about the better management needed to get the higher yields given in columns B.

Make a farm plan

Study your soils. See whether you have been cultivating any that would make better pasture or woodland. Compare the yields you have been getting with those you could expect under different management. Then decide whether or not you should change your methods of farming. The choice, of course, must be yours. You will probably need help to make your own farm plan if you decide to change your methods. This report will help you in planning, but it is not a plan of management for your farm or any other single farm in the county.

If you find that you need help in farm planning, consult the Soil Conservation Service or the county agricultural agent. Members of your State experiment station staff and others familiar with farming in your county will also be glad to help you.

Soils of the county as a whole

Many users of the report will want to know something about the kinds of soil that occur in each part of the county. The section Soil Associations will be useful to them. Information about principal rock formations, climate, vegetation, and several other topics appear in the section General Nature of the Area. A section on agriculture covers information about crops, livestock and livestock products, farm facilities and equipment, and irrigation. A technical discussion of the soils is given in the section Soil Series and Their Relations.

This publication on the soil survey of Madison County, Ala., is a cooperative contribution from—

SOIL CONSERVATION SERVICE
ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES
ALABAMA AGRICULTURAL EXPERIMENT STATION
TENNESSEE VALLEY AUTHORITY

Series 1947, No. 3 Issued February 1958

SOIL SURVEY OF MADISON COUNTY, ALABAMA

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Area inspected by J. W. MOON, Soil Survey

United States Department of Agriculture in cooperation with the Alabama Department of Agriculture and Industries, the Alabama Agricultural Experiment Station, and the Tennessee Valley Authority

Contents

[1] Field work was done while Soil Survey was part of the Bureau of Plant Industry, Soils, and Agricultural Engineering. Soil Survey was transferred to the Soil Conservation Service on November 15, 1952.

AGRICULTURALLY, Madison County is one of the most productive counties of Alabama; about 81.5 percent of its soils are suitable for crops. Except for the mountainous section along the eastern edge, most of the county is open farmland. Much of the soil has deteriorated in fertility, tilth, and moisture-holding capacity but still responds well to proper management. Cotton is now the chief crop, but a greater diversity of crops would be desirable. In particular, acreage in legumes and grasses should be increased.

To provide a basis for the best agricultural uses of the land, a cooperative soil survey was made by the United States Department of Agriculture, the Alabama Department of Agriculture and Industries, the Alabama Agricultural Experiment Station, and the Tennessee Valley Authority. Field work was completed in 1947, and, unless otherwise specifically indicated, all statements in this report refer to conditions in the county at that time.

General Nature of the Area

Location and extent

Madison County is in the central part of the most northern tier of Alabama counties (fig. 1). Its northern boundary runs approximately along 35° N. latitude; the Tennessee River and its tributary, the Paint Rock River, form its southern boundary. It has a total area of about 803 square miles, or 513,920 acres. The Wheeler Reservoir covers 4,360 acres of this area.

Organization and population

Shortly after the beginning of the nineteenth century, settlers mainly of English or Scotch descent began to come into the area from the neighboring States of Tennessee, Georgia, North Carolina, South Carolina, Virginia,

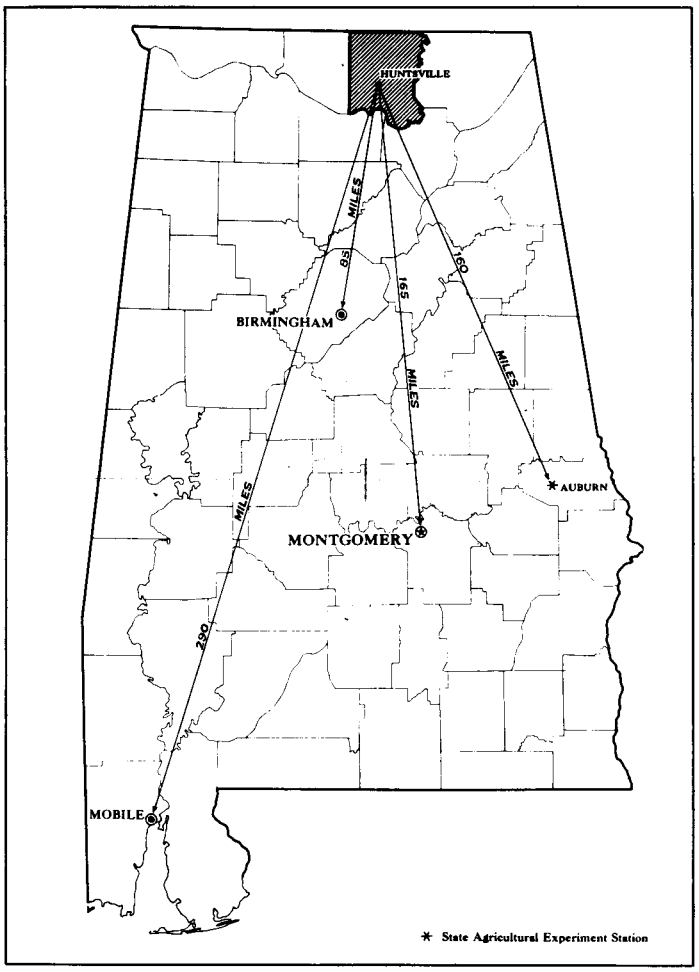

Figure 1.—**Location of Madison County in Alabama.**

and Kentucky. Madison County was formed in 1808. In 1930 its population was 64,623, and the population had increased to 72,903 by 1950. Huntsville, the county seat, is approximately 85 miles north of Birmingham. Huntsville had a population of 16,437 in 1950.

Industries and manufacturing

Stoves, agricultural implements, and shoes are made in the Huntsville area, and cotton mills are located there. Woodworking mills in and around the city manufacture articles from forest products, and portable sawmills are common in forested areas throughout the county. Two Federal arsenals, which at peak production during World War II employed approximately 11,000 people, are located on two large tracts south of Huntsville.

Coal is mined on a small scale in the mountainous sections of the county. Limestone is taken from a few quarries in these areas and is usually made into lime for agricultural use. Gravel is dredged commercially from the Tennessee River.

Transportation

The main line of the Southern Railway connecting Memphis and Chattanooga, Tenn., passes through Huntsville. A branch line of the Nashville, Chattanooga, and St. Louis Railroad connects Huntsville with its main line at Decherd, Tenn.

Good roads, many of which are hard surfaced, make all of the county except some of the mountain areas easily accessible to cars and trucks. As a result, the churches and consolidated schools are reasonably easy to reach from all parts of the county.

A 9-foot channel is maintained on the Tennessee River for shipping. Port facilities are provided at Decatur, Ala., 39 miles southwest of Huntsville.

Physiography, drainage, and geology

Physiography

The main physiographic areas of the county are a remnant of the Cumberland Plateau in the eastern third of the county, and the smooth plain that is part of the eastern Highland Rim of the Interior Low Plateau (*2*)[2] (fig. 2). In Alabama this smooth plain includes the gray lands and red lands of the Tennessee Valley.

The Cumberland Plateau.—This area consists of the steep western facing scarp of the Cumberland Plateau and outlying remnants that are predominantly steep to very steep stony slopes. Small remnants of the smooth plateau occur on the crest of these outliers and on the plateau proper along the eastern county line. Hartsells, Muskingum, and Rockland, limestone, soils are predominant in this mountainous country.

The Highland Rim.—The relief of this area is predominantly undulating to rolling. The Highland Rim lies approximately a thousand feet lower than the crest of the Cumberland Plateau ridges. It has two subdivisions: (1) The gray lands, which consist of yellowish cherty residuum from cherty limestone, and (2) the red lands, which consist of reddish residuum from high-grade limestone and a variable amount of old general alluvium that has been widely distributed.

The gray-lands area is mainly in the northwestern part of the county. It consists predominantly of undulating and rolling Dickson and Baxter soils. The red lands occupy a broad undulating and rolling belt that extends southwestward from the Alabama-Tennessee line in the vicinity of Plevna to the extreme southwestern corner of the county, including Madison and Triana. Cumberland and Decatur soils are predominant in much of this landscape.

Old general alluvium.—This material occupies a large part of the lower areas of the Tennessee River Valley. The most extensive of these old general alluvial areas lie in the southeastern part of the county. Throughout much of the red lands or central part of the county, however, areas of old alluvium or colluvium occur that are difficult to distinguish from the associated red soils developed from limestone residuum in place. Fairly large areas of young alluvium occupy belts along the larger streams; they comprise the first bottoms. The largest areas occur along the Tennessee River. Most of this young alluvium consists of a mixture of sediments derived from limestone, sandstone, and shale. A considerable area of young alluvium was permanently inundated by the Wheeler Reservoir.

Drainage

The county is drained by the Tennessee River. The surface drainage system is roughly dendritic. Except on

[2] Italic numbers in parentheses refer to Literature Cited, p. 93.

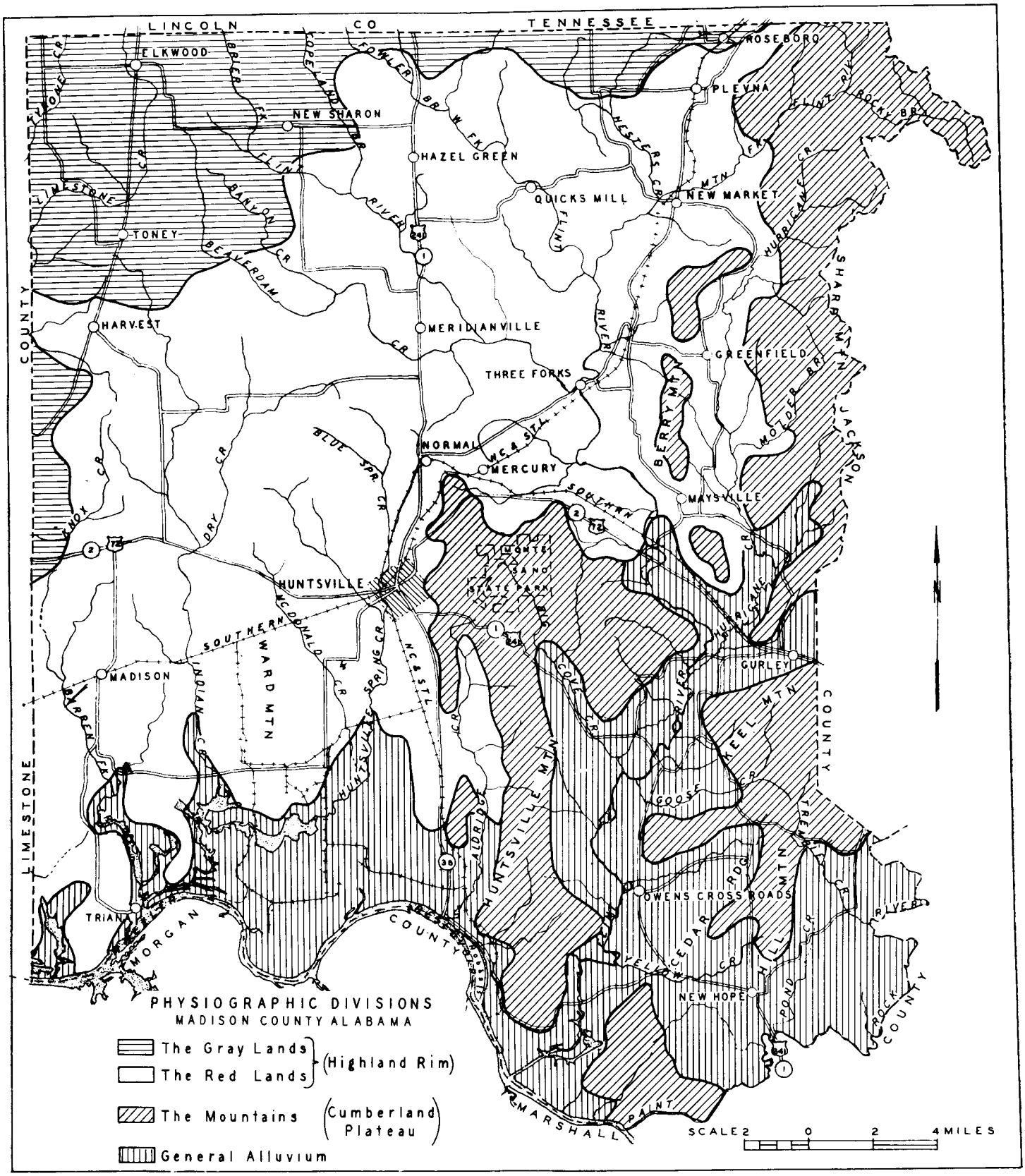

Figure 2.—**Physiographic map of Madison County, Ala.**

the smoother general alluvial plains in the southeastern part of the county and in places in the red-lands belt, this drainage system is fairly well established.

Throughout much of the red-lands belt, a number of shallow depressions or sinks occur that do not have surface-drainage outlets. Poor soil drainage is confined to some of the nearly level areas on the old stream terraces, or on old general alluvium, and to the young alluvium on bottom lands along larger streams. Practically all other parts of the county are moderately well drained, well drained, or excessively drained.

The Tennessee River, which consists of backwater from the Wheeler Dam, has a surface elevation of about 556 feet. The elevation of the Highland Rim ranges from approximately 590 feet at New Hope on an old alluvial plain to 850 feet in the northwestern gray-lands area. The elevation at the railroad station at Huntsville is 612 feet. The crest of the Cumberland Plateau, and of its higher remnants, ranges from about 1,500 to 1,700 feet. The highest points in the county are along the line between Jackson and Madison Counties.

Geology

The rocks of the county are sedimentary in origin. They consist predominantly of limestone of many varieties, sandstone, and some acid shales. They are relatively level bedded (*1*).

Chickamauga limestone.—Geologically, the oldest rocks in the county are in the Chickamauga limestone formation of the Ordovician system. This limestone is thin bedded, cobbly, and highly fossiliferous; it has clayey lenses. A small area is exposed in the northwestern part of the county, and another in the north-central part along the Flint River.

Fort Payne chert.—This formation overlies the Chickamauga limestone. It is the lowest member of the Mississipian system. It consists of coarsely crystalline thick-bedded limestone and beds of dark siliceous shale that weather and leave black flint and chert. The cherty residuum is from 40 to 50 feet thick. Several square miles of Dickson, Cookeville, and Baxter soils, mainly in the northwestern part of the county, were derived from this parent material.

Tuscumbia limestone.—This formation includes both the Warsaw and St. Louis limestones of the Mississippian system. It is the surface formation for more than half of the county. The lower part (Warsaw) is cherty and the parent material of some of the less red soils, such as Baxter and Cookeville. The upper part (St. Louis) is a high-grade nearly chert-free limestone that is the parent material of the redder Dewey and Decatur soils. Tuscumbia limestone is the surface rock in that part of the county extending westward from the mountainous eastern border to the northwestern quarter, where the Fort Payne chert predominates.

The Gasper formation.—This formation lies directly above the Tuscumbia limestone and includes St. Genevieve limestone. It is the surface rock in the southern parts of the Flint and Paint Rock River Valleys and along the base of the mountains. Colbert, Talbott, and Hollywood soils developed from rocks of this formation, but much of the rock is covered by old alluvium or valley fill.

Hartselle sandstone.—This formation is above the Gasper formation and occurs as a thin capping on Capshaw, Rainbow, King, and Weatherly Mountains. It also forms a bench about 300 feet below the summit of Wade Mountain. It consists of medium-grained sandstone and gives rise to Pearman and Hartsells soils.

Bangor limestone.—This formation, which lies above the Hartselle formation, is 450 to 500 feet thick. It outcrops on the upper slopes of all of the mountains that are capped with rock of the Pottsville formation. It forms the cap on the Wade and King Mountains. Many of the mountain slopes occur on this formation. They are mapped as steep, hilly, or rolling phases of Rockland, limestone.

The Pottsville formation.—This is the highest lying formation and is geologically the youngest. It belongs to the Pennsylvanian system. The upper part is hard massive sandstone that gives rise to Hartsells, Linker, and Muskingum soils. This part is about 200 feet thick. It forms the cap on the mountain along the eastern border of the county and on some of the other mountains. The lower part consists of a bed of shale about 30 feet thick.

Vegetation

Originally, practically all of Madison County was under forest, which was mainly deciduous. Some pines were intermixed with the deciduous trees, especially on the sandy soils of the mountains. Nearly solid stands of redcedar were on the slopes that have shallow soils over limestone. Oaks, hickories, yellow-poplars, and chestnuts were among the more common deciduous trees; the chestnut trees were later killed by blight.

Forest, which is practically all cut over, now occupies about 33 percent of the county (*3*). The most extensive areas are on the mountain slopes; approximately 53 percent of the forest is on farms. About 3,573 acres have been planted to trees, of which approximately 1,611 acres are on property of the Tennessee Valley Authority. As of June 30, 1948, all forest land in Madison County was under organized fire protection (*4*).

Of the present forest, about 19 percent consists of bottom-land hardwoods, about 46 percent of upland hardwoods, approximately 7 percent of loblolly, yellow, and mixed yellow pines and hardwoods, and around 28 percent of cedar-hardwoods (*3*).

The more useful common deciduous trees at the present time are black, post, white, red, laurel, Spanish, chestnut, and willow oaks, shagbark, pignut, and black hickories, sweetgum, blackgum, and tupelo gum, red elm and white elm, yellow-poplar, beech, maple, cherry, ash, and walnut. Other common deciduous trees are persimmon, sassafras, ironwood, sourwood, dogwood, blackjack oak, willow, birch, sycamore, redbud, plum, hackberry, buckeye, honey locust, and black locust.

Loblolly, shortleaf, and scrub pines are the predominant pines. They are apparently more abundant now than in the virgin forest. They commonly establish themselves in abandoned fields. Yellow pines and scrub pines are more common in cutover forests on the sandy soils of the mountaintops than on the lowlands. As in the original forest, cedar predominates on many of the areas of Rockland, limestone.

Climate

The climate of Madison County is humid, temperate, and continental (*5*). Summers are long and hot, and generally the winters are mild and pleasant. Temperatures in winter, however, at times drop below freezing at

night and occasionally remain below freezing for 1 to 3 days or longer.

Normal monthly, seasonal, and annual temperature and precipitation data are given in table 1. These data are compiled from records at the United States Weather Bureau station at Madison.

Both temperatures and precipitation at Madison are typical of those in the main part of the farming area. The growing season there averages 208 days; on the average the last frost in the spring is no later than April 5, although there have been frosts as late as May 2. In the fall the average first frost is October 31, although frost has occurred as early as October 10.

Although temperature records are not available for the plateau or mountaintops, temperatures at these higher elevations are from 5 to 6 degrees lower than those in the lower farming areas. Growing seasons are shorter because the first killing frost arrives earlier and the last killing frost comes later in spring.

Precipitation is distributed fairly evenly throughout the year, but it is highest during winter and lowest during fall. The soil is usually moist to wet during the winter, moist during the spring and early summer, and dry during the late summer and fall. Floods are most common from the middle of December to mid-April, although they occur at other times. The heaviest floods have occurred in the summer, but extensive floods are infrequent. Snow occurs occasionally but seldom remains long on the ground. Occasionally, however, the snow remains for several days.

Normally temperature and precipitation are favorable for producing and harvesting crops. Below normal temperatures, however, and either too little or too much moisture in the spring, sometimes are detrimental to crops. A late spring delays the maturing of cotton and favors boll weevil infestation. Fruit crops, especially peaches, are sometimes severely damaged by late spring frosts.

Although prolonged droughts are rare, excessive dryness in the late summer sometimes reduces yields. Moderately dry conditions, which are favorable for harvesting, prevail throughout the fall months, but in an occasional year the rains are so frequent and heavy as to interfere considerably with harvest. A dry fall is somewhat unfavorable for fall-sown grains, grasses, and legumes.

Prevailing winds are from the northwest; winds from the west and northeast, however, are also fairly common during the fall and winter. The average wind velocity is highest during the winter and lowest during the summer.

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Madison, Madison County, Ala.*

[Elevation, 573 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1941)	Wettest year (1923)	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	43. 4	77	1	5. 36	5. 18	9. 28	1. 0
January	42. 2	79	−8	4. 63	4. 29	6. 02	. 7
February	44. 2	80	−10	4. 58	. 99	6. 24	1. 2
Winter	43. 3	80	−10	14. 57	10. 46	21. 54	2. 9
March	52. 9	90	10	5. 73	3. 57	7. 25	. 1
April	60. 8	95	24	4. 83	2. 92	6. 69	[3]
May	69. 4	99	32	3. 99	. 59	8. 07	0
Spring	61. 0	99	10	14. 55	7. 08	22. 01	. 1
June	77. 0	106	40	4. 26	2. 99	6. 42	0
July	79. 8	111	50	4. 62	3. 97	6. 67	0
August	79. 2	108	50	3. 79	3. 85	6. 23	0
Summer	78. 7	111	40	12. 67	10. 81	19. 32	0
September	74. 7	108	31	3. 01	1. 08	1. 32	0
October	62. 7	96	23	3. 39	3. 00	1. 09	[3]
November	51. 2	84	10	3. 52	2. 50	4. 88	. 2
Fall	62. 9	108	10	9. 92	6. 58	7. 29	. 2
Year	61. 5	111	−10	51. 71	34. 93	70. 16	3. 2

[1] Average temperature based on 60-year record inclusive of 1953; highest and lowest temperatures on a 37-year record inclusive of 1930.

[2] Average precipitation, and wettest and driest years based on 60-year record, 1894–1953, inclusive (1950 incomplete); snowfall based on a 37-year record, 1894–1930, inclusive.

[3] Trace.

Agriculture

Madison County is predominantly agricultural, although manufacturing and services needed for distributing, marketing, and shipping are carried on extensively at Huntsville. Approximately 81 percent of the county, or 417,622 acres, was in farms in 1950. Of this acreage, about 71 percent was owned by the operator who farmed it. Although owners worked a large part of the acreage, tenants operated 2,759 out of a total of 5,004 farms in the county. The average size of farms in the county was 83.4 acres.

A total of 197,934 acres was harvested cropland in 1950. Crops are the chief source of income, and cotton is by far the most important one grown. Other sources of income are livestock and livestock products, including dairy and poultry products, and forest products.

Crops and pasture

Cotton and corn have been the chief crops for the past 60 years (fig. 3). Cotton is grown extensively through-

***Figure 3.*—This field of cotton on Decatur and Cumberland silt loams, undulating phases, will yield more than 500 pounds of lint cotton an acre.**

out the county except in the mountain section. The largest acreage and probably the highest yields are in the red-lands sections. Acreages of cotton and of the other principal crops grown in Madison County are shown in table 2.

Much of the corn is raised for livestock feed, but it is used also for human consumption. Grain sorghum, grown for livestock feed, has become an important crop, and soybeans are grown extensively. The fall-sown small grains consist principally of wheat and oats. Lespedeza has been the principal hay crop, but other legumes, chiefly alfalfa, have proved to be more desirable and are increasing in acreage. Crimson clover, grown for seed as well as for winter cover, is of great importance throughout most of the county. Lespedeza and vetch for seed are grown on a fairly large acreage.

Land in pasture in Madison County in 1949 totaled 84,056 acres. The quality of pasture has improved in recent years. Winter legumes also have been used more extensively as cover crops and for winter grazing.

Nursery stock, which consists of fruit trees, ornamental plants, shrubs, vines, and berries, is grown extensively. Some commercial apple orchards have been specializing in the shipment of early green apples to the northern markets. A few orchards grow apples and peaches for local markets.

Livestock and livestock products

The number of livestock on farms in Madison County for stated years is shown in table 3. Both mules and horses are used as work animals, but mules have always been used more extensively. Both have decreased in importance, however, as tractors have become more numerous.

Hogs are the most important of the meat animals. About 20,790 were sold alive, and about 7,492 were butchered on farms in 1949. Most of the farmers raise a few for home use.

Of the 21,341 cattle on farms in 1950, 7,146 were cows and heifers milked. About 7,647 cattle and calves were sold alive, and about 275 were butchered on farms. There are a few large dairy herds in the county, but many of the milk cows are in small herds or on farms that have only one or two milk cows. The local supply of raw milk for the Huntsville urban area is not adequate, and a considerable amount comes in from outside the county. The Huntsville market takes a large part of the dairy products sold in the county.

TABLE 2.—*Acreage of principal crops in Madison County, Ala., for stated years*

Crop	1919	1929	1939	1949
	Acres	*Acres*	*Acres*	*Acres*
Cotton	83, 636	129, 790	76, 951	109, 351
Corn for grain	83, 738	59, 456	80, 447	55, 831
Wheat threshed or combined	1, 141	177	1, 083	1, 301
Oats threshed or combined	921	178	533	1, 953
All hay, exclusive of sorghums	25, 780	22, 453	64, 298	19, 377
Sorghums for all purposes except sirup	(1)	595	419	2, 597
Lespedeza seed	(1)	(1)	5, 021	826
Clover seed	(1)	1, 030	382	[2] 3, 459
Vetch seed	(1)	(1)	(1)	831
Potatoes harvested for home use or for sale	467	724	1, 005	416
Sweetpotatoes harvested for home use or for sale	[3] 602	[3] 346	[3] 650	128
Nursery products (trees, shrubs, vines, ornamentals and so on)	(1)	(1)	1, 000	1, 098

[1] Figure not available.
[2] Crimson clover only.
[3] Includes yams.

TABLE 3.—*Number of livestock on farms in Madison County, Ala., for stated years*

Kind	1920	1930	1940	1950
Horses	5, 122	2, 455	[1] 2, 317	1, 288
Mules	9, 283	11, 479	[1] 9, 032	4, 341
Cattle	19, 493	14, 107	[1] 15, 425	21, 341
Swine	27, 308	12, 675	[2] 16, 415	27, 104
Sheep	525	808	[3] 594	2, 956
Goats	1, 509	1, 418	[2] 1, 096	(4)
Poultry (chickens)	185, 200	[1] 140,143	[2] 143,080	[2] 145,591

[1] Over 3 months old.
[2] Over 4 months old.
[3] Over 6 months old.
[4] Figure not available.

Farm facilities and equipment

In 1950, 3,890 farm homes in the county had electricity and 373 had telephones. Approximately 42 percent of all farms were within 0.2 mile of all-weather roads. The total number of tractors was 3,082, and of motortrucks, 1,642.

Soil Survey Methods and Definitions

The scientist who makes a soil survey examines the soils in the field, classifies them in accordance with facts that he observes, and maps their boundaries on an aerial photograph or other map.

Field study.—The soil surveyor bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern but are located according to the lay of the land. Usually they are not more than a quarter of a mile apart, and sometimes they are much closer. In most soils such a boring or hole reveals several distinct layers, called horizons, which collectively are known as the soil profile. Each layer is studied to see how its profile differs from others and to learn the things about the soil that influence its capacity to support plant growth.

Color is usually related to the nature of the parent material, the degree of oxidation, the content of organic matter, or to all three factors. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture is determined by amounts of sand, silt, and clay. In the field it is determined by the way the soil feels when rubbed between the fingers. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer and whether it is easy or difficult to till.

Structure, which is the way the individual soil particles are arranged in larger grains and the amount of pore space between the grains, gives us clues as to the ease or difficulty with which the soil is penetrated by plant roots and by moisture.

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation.

Other characteristics observed in the course of the field study and considered in classifying the soil include the following: The depth of the soil over bedrock or compact layers; the presence of gravel or stones in amounts that will interfere with cultivation; the steepness and pattern of slopes; the degree of erosion; the nature of the underlying rocks or other parent material from which the soil has developed; and acidity or alkalinity of the soil as measured by chemical tests.

Classification.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified into phases, types, and series. The soil type is the basic classification unit. A soil type may consist of several phases. Types that resemble each other in most of their characteristics are grouped into a soil series.

As an example of soil classification, consider the Allen series. This series is made up of three soil types, which are placed in phases as follows:

Series	*Type*	*Phase*
Allen	Fine sandy loam	Undulating.
		Eroded undulating.
		Eroded rolling.
	Clay loam	Severely eroded rolling.
	Stony fine sandy loam	Eroded undulating.
		Eroded rolling.
		Eroded hilly.

Soil type.—Soils similar in kind, thickness, and arrangement of soil layers are classified as one soil type.

Soil phase.—Soil types may be divided into two or more phases to show significant differences in slope, stoniness, degree of erosion, and depth to bedrock.

The soil phase (or the soil type if it has not been subdivided) is the unit shown on the soil map. It is the unit that has the narrowest range of characteristics. Use and management practices therefore can be specified more easily than for soil series or for yet broader groups that contain more variation.

Soil series.—Two or more soil types that differ in surface texture, but are otherwise similar in kind, thickness, and arrangement of soil layers, are normally designated as a soil series. In a given area, however, it frequently happens that a soil series has only one soil type. Each series is named for a place near which the soil was first mapped.

Miscellaneous land types.—Fresh stream deposits, and rough, stony, and severely gullied land that have little true soil are not classified into types and series but are identified by descriptive names such as Rockland, limestone, steep; and Stony rolling land, Talbott and Colbert soil materials.

Soil complex.—When two or more soils are so intricately associated in small areas that it is not feasible to show them separately on the soil map, they are mapped together and called a soil complex. This is true of Talbott-Colbert cherty silty clay loams, eroded hilly phases. This is a complex of Talbott cherty silty clay loam, eroded hilly phase, and Colbert cherty silty clay loam, eroded hilly phase.

The Soils of Madison County

The soils of Madison County differ greatly in color, texture, consistence, acidity, fertility, relief, drainage, stoniness, depth to bedrock, and permeability. All of these characteristics affect the productivity and the ease with which the soils can be worked and conserved. Accordingly, they affect the agricultural use to which the soils are suited and the requirements for proper management.

Color.—The soils range in color from nearly white to gray or yellow, and from brown to red. Colors intermediate between brown and gray are predominant in the surface soils, whereas red and yellow are predominant in the subsoils.

Texture and consistence.—In great part, the soils are cherty silt loams, silt loams, and silty clay loams. In general they are mellow and friable except where erosion has removed a large part of the original surface soil. The subsoils are mainly silty clay loams and silty clays, but on a small acreage the subsoils are sandier. The consistence of the subsoils ranges from friable to strongly plastic or very firm.

Relief.—Undulating and rolling relief predominate. Nearly level soils cover about 30 percent of the county. Much of this acreage occurs along streams on the bottom lands or occupies gentle depressions in the red lands. The relief of about 38 percent of the county is undulating. Soils with undulating relief are common throughout the red lands and gray lands and the older parts of the alluvial plains. About 12 percent of the acreage of the county has a rolling surface. This acreage, like that with undulating relief, is widely distributed throughout the red lands and gray lands. The broader ridges in the mountainous part of the county also have undulating to rolling surfaces. Approximately 6 percent of the county has a hilly surface. Much of the hilly land is associated with the steep mountain slopes, although a great many small hilly areas occur throughout the red lands and gray lands. Steeply sloping soils occupy about 14 percent of the county. Most of their acreage occurs on the strong mountain slopes in the eastern part of the county.

Drainage.—Well-drained soils cover about half of the county. These soils have adequate drainage for all crops, including the more exacting ones such as alfalfa and cotton. They are predominantly red or yellow in color to a depth of 30 inches or more. They are widely distributed throughout the red lands, gray lands, and the smooth ridgetops in the mountainous section.

Moderately well drained soils, those which have free drainage of excess moisture to a depth of 20 to 24 inches, cover about 18 percent of the county. These soils are suited to numerous crops, but at certain seasons excess moisture makes them difficult to work and unsuitable for the more exacting crops. The moderately well drained soils are widely distributed and are predominant throughout the gray lands.

Somewhat poorly drained soils occupy about 4 percent of the county. These soils are suited to certain crops but are decidedly deficient in drainage for the more exacting ones. They are widely distributed throughout the gray lands and the alluvial plains; small areas also occur in the red lands. The separate tracts of these soils usually are considerably smaller than those of the well drained and moderately well drained soils.

About 9 percent of the soils are poorly drained. In general, these poorly drained soils are distinguished by their gray surface soil and their gray mottled subsoil. They are poorly suited to most row crops, but crop production usually can be improved by adequate artificial drainage. Most of these soils are moderately productive of pasture. The poorly drained soils, in general, occur

in small areas in the gray lands and on the alluvial plains.

Excessively drained soils make up approximately 19 percent of the total acreage. Moisture drains from these soils within a short time, and they are left without enough water for plant needs. Most of the excessively drained soils have a shallow depth to bedrock and a strong slope and occur on mountain slopes. Nevertheless, one nearly level soil, Bruno loamy fine sand, has excessive drainage because of its extremely sandy texture. It has a small acreage.

Stoniness.—Soils that are free from stones occupy about 64 percent of the county. Their most extensive acreage is in the red lands and on the alluvial plains, but more limited areas occupy positions on the undulating and rolling mountaintops. Approximately 17 percent of the area of the county is covered by soils that contain enough stones to interfere with tillage but not to prevent it. The cherty soils in the gray-lands section of the county make up a considerable part of the stony soils. More limited areas occur along the bases of the mountains. Soils and land types that are too stony to permit feasible tillage occupy about 19 percent of the total area. Most of their acreage is on the strong mountain slopes in the eastern part of the county.

Depth to bedrock.—There is a wide range in depth to bedrock. In some areas soil material or residuum extends to a depth of 30 or 40 feet; in others bedrock outcrops at the surface. Soils that have an average depth of more than 4 or 5 feet to bedrock cover about 75 percent of the county, principally in the red-lands and gray-lands sections. Soils that average from 1½ to 5 feet in depth to bedrock occupy only about 6 percent. Much of this acreage is on the undulating and rolling mountaintops and on the slopes in the valleys directly below the steep, stony mountain slopes. Soils and land types that are less than 1½ feet in depth to bedrock occupy approximately 19 percent of the total area. Much of this acreage is on the strong mountain slopes.

Productivity.—The most productive soils occur on the bottom lands, alluvial plains, and the red lands. Their total area covers about 33 percent of the county. Soils of moderate productivity occupy about 32 percent of the total area, and much of their acreage is in the gray lands and on the alluvial plains. Soils of low productivity occupy about 35 percent of the county and are widely distributed. The most extensive acreage and the largest tracts occur on the mountain slopes and ridgetops and in the gray-lands section.

Use suitability.—Chiefly because of physical differences, the soils differ from one another in their suitability for agricultural use. Some are highly productive, easy to work, and easy to conserve. Others are unproductive, extremely hard to work, and difficult to conserve.

About 67 percent of the soils of the county are suitable for crops that require cultivation. About 14 percent, although not suitable for crops, are sufficiently productive to be pastured. The remaining 19 percent are suitable only for forest.

About 13 percent of the soils suitable for crops are productive, easily worked, and easily conserved. About 38 percent have some unfavorable characteristics that somewhat limit their suitability for crops. Soils with decided limitations make up about 16 percent of the acreage. With more elaborate management, however, they can be maintained at a sufficiently high level of productivity to make them useful for crop production.

Soil series and their relations

To make full use of this soil survey, it is necessary to know the soils and to understand how they are related to each other. On the basis of differences in their characteristics, the soils of Madison County have been classified into 48 series and several miscellaneous land types.

The relationship of the soils is more easily understood if they are grouped according to their position on the landscape. Table 4 groups the soil series according to position and shows parent rock and predominant drainage for each.

Table 5 has been provided for soil scientists interested in the morphology and genesis of soils. It groups the soils according to order, great soil groups, and series. For each series it gives the three factors of soil formation most responsible for differences among the series—relief, parent material, and degree of horizon differentiation that has taken place through time. Inasmuch as climate and vegetation are relatively uniform, they do not account for the broad differences among the series.

Soils on uplands

Upland soils occupy positions above the adjacent stream bottoms and terraces. In this county the upland soils consist of material derived directly through the decay of rock in place. The Decatur, Dewey, Baxter, Cookeville, Dickson, Lawrence, Guthrie, Bodine, Talbott, Colbert, Dowellton, Hartsells, Linker, Muskingum, and Pearman soils belong to this group. The properties of these soils are generally closely related to those of the parent rock. The Decatur and Dewey soils, derived from high-grade limestone, are the reddest of the soils of the uplands. They are among the strongest and most productive soils of the county.

The Baxter, Cookeville, Dickson, Lawrence, Guthrie, and Bodine soils were derived from cherty or very cherty limestone. The Baxter and Cookeville soils have light yellowish-red subsoils. They are well drained and deep to bedrock and have moderate fertility.

The Dickson soils are moderately well drained, as their drainage is impaired by a siltpan at a depth of about 24 inches. They are much lighter in color than the Baxter and Cookeville soils. Their surface layer is predominantly gray and their subsoil predominantly yellow; the mottled siltpan is at depths of 15 to 28 inches.

Lawrence silt loam is also a siltpan soil, but its subsoil directly below the surface layer is a mottled pale brownish yellow. It has a smoother surface than the Dickson soils and occupies somewhat lower positions. The siltpan may be at depths ranging from 12 to 18 inches.

Guthrie silt loam is poorly drained. It is on the lowest, most nearly level, parts of the landscape in which it occurs and is associated with the Dickson and Lawrence soils. Most Guthrie silt loam has a claypan at a depth of about 12 inches.

The Bodine soils occupy the strongest slopes in the gray-lands section. They are associated with the Baxter, Cookeville, Dickson, Lawrence, and Guthrie soils. The Bodine soils are very cherty, and the subsoil is not so well developed as in the associated soils.

The Talbott, Colbert, and Dowellton soils were derived from clayey or argillaceous limestone, mainly Bangor and Gasper limestones. They have a very firm or plastic subsoil. Their depth to bedrock is considerably shallower, and they are less permeable than the Decatur, Dewey, Baxter, and Cookeville soils. Their drainage is suffi-

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TABLE 4. *Soil series of Madison County, Ala., grouped according to topographic position, and the parent rock and predominant drainage for each*

Position and parent rock	Excessively drained [1]	Well drained [2]	Moderately well drained [3]	Somewhat poorly drained [4]	Poorly drained [5]
Soils on uplands:					
High-grade limestone and old valley fill.		Decatur			
High-grade limestone		Dewey			
Cherty limestone		Baxter, Cookeville	Dickson (cherty), Dickson (chert free).	Lawrence	Guthrie.
Very cherty limestone	Bodine				
Clayey (argillaceous) limestone		Talbott			
Very clayey (argillaceous) limestone.			Colbert	Dowellton	
Sandstone (some shale)	Muskingum	Hartsells, Linker			
Sandstone, shale, and limestone			Pearman		
Soils on stream terraces (old general alluvium):					
Chiefly limestone, some shale and sandstone.		Cumberland, Etowah	Capshaw, Captina, Wolftever	Taft	Robertsville.
Chiefly cherty limestone		Humphreys			
Chiefly clayey limestone; in places some shale.				Tupelo	
Sandstone and shale, some limestone.			Holston	Monongahela	Tyler.
Chiefly sandstone, some shale and limestone.		Sequatchie			
Soils on old colluvial land (old local alluvium):					
Chiefly limestone		Hermitage			
Limestone, predominantly cherty		Hermitage (cherty)			
Clayey limestone				Hollywood	
Sandstone and shale, some limestone.		Allen, Jefferson			
Soils on young colluvial land [6] (young local alluvium):					
High-grade limestone		Abernathy		Ooltewah [7]	Guthrie.
Cherty limestone		Greendale		Ooltewah [7]	Guthrie.
Sandstone, some shale					Lickdale. [8]
Soils on bottom lands [6] (young general alluvium):					
High-grade limestone		Huntington	Egam	Lindside [7]	Melvin.
Cherty limestone		Ennis		Lobelville [7]	Lee.
Clayey limestone					Dunning.
Sandstone, shale, and limestone				Hamblen [7]	Prader.
Chiefly sandstone, some shale and limestone.	Bruno				

[1] Indistinct profile caused by rapid geologic erosion or by lack of clay and silt; surface drainage rapid to very rapid; color varies with parent material.

[2] Red to yellowish-brown subsoils, free of mottling to a depth of about 30 inches.

[3] Yellow to yellowish-brown subsoils, mottled at a depth of about 24 inches.

[4] Pale yellow, mottled or gray below a depth of about 6 inches.

[5] Light brownish gray to light gray, more or less mottled throughout.

[6] These soils do not have distinct textural horizons mainly because of the short time their parent materials have been in place.

[7] These soils mapped as somewhat poorly drained to moderately well drained.

[8] Parts are upland, the soil here having been developed in place from the parent rock.

ciently impaired to cause the subsoils to be faintly to moderately mottled.

The Colbert soils have a yellowish-brown rather than a yellowish-red subsoil; the subsoil is a very plastic clay more or less mottled at a somewhat shallower depth than is common in the Talbott soils.

Except for the surface layer, Dowellton silt loam consists of plastic clay, and the development of the subsoil or profile is less marked than in the Talbott and Colbert soils. The internal drainage is slow, and mottling is within a few inches of the surface.

The Hartsells, Linker, and Muskingum soils have developed from sandstone, chiefly of the Pottsville formation. They are permeable, rather low in fertility, and, on the whole, shallow to bedrock. The Hartsells and Linker soils occur on the undulating to rolling ridgetops. They have yellowish-brown to brownish-gray friable sandy surface soils and yellowish to yellowish-red friable to firm fine sandy loam to fine sandy clay loam subsoils. Bedrock is at depths ranging from 1½ to 6 feet. The Muskingum soils occur on strong slopes. As a consequence, their depth to bedrock is shallower and their profile is not so well developed. Sandstone fragments are common, and some rock outcrops occur.

Pearman loam has developed from sandstone, shale, and limestone. It is rather shallow to bedrock, the average depth being about 2½ feet. It is characterized by a heavy or clayey subsoil that greatly impairs internal drainage and permeability to moisture and roots. This soil is not extensive.

Soils on stream terraces (old general alluvium)

The rivers and streams flowed at considerably higher levels in the past, and at these levels they deposited gravel, sand, and clay on their flood plains. The channels were gradually deepened by stream cutting. New flood plains were formed at lower levels, but remnants of the older high-lying flood plains remained. Most of these areas are now above the overflow stage of the present streams, and they constitute the stream terraces or terrace land. They are frequently called second bottoms or benches. The soils on these stream terraces are distinguished from those on the first bottoms chiefly by greater age and by more mature profiles; that is, they have more distinct surface-soil and subsoil layers.

The greatest differences among the soils on stream terraces are related to differences in internal drainage. Some differences, however, are related to the parent material or parent rock from which the material originated. The Cumberland, Etowah, Humphreys, and Sequatchie soils are well drained and in general are free of mottling to a depth of more than 30 inches. The Cumberland and Etowah soils consist of materials derived largely from limestone, but smaller admixtures of materials from sandstones and shales are included. The Humphreys soils were derived predominantly from cherty limestone. They are lighter colored—the surface layers are grayer and the subsoil more yellow than those of the Cumberland and Etowah soils. The Sequatchie soils are predominantly sandy. They consist largely of material derived from sandstone.

The Capshaw, Captina, Wolftever, and Holston soils are moderately well drained. Their surface layers are predominantly pale yellow to light yellowish brown, and

TABLE 5.—*Soils of Madison County, Ala., classified by higher categories, and the relief, parent material, and horizon differentiation for each*

Great soil group and series [1]	Relief	Parent material	Degree of horizon differentiation
ZONAL SOILS			
Red-Yellow Podzolic soils:		Residuum from weathering of—	
Decatur	Undulating to hilly	High-grade limestone	High.
Dewey	Undulating to hilly	High-grade cherty limestone	High.
Cookeville	Undulating to rolling	Cherty limestone	High.
Baxter	Undulating to hilly	Cherty limestone	Medium to high.
Talbott	Undulating to rolling	Argillaceous limestone	High.
Linker	Undulating to rolling	Sandstone, some shale	High.
Hartsells	Undulating to rolling	Sandstone, some shale	Medium.
		General alluvium consisting of material derived from—	
Cumberland	Undulating to hilly	Chiefly limestone, some shale and sandstone.	High.
Etowah	Undulating to rolling	Same	Medium.
Capshaw [2]	Nearly level to undulating	Same	High.
Humphreys	Same	Chiefly cherty limestone	Medium.
Sequatchie	Same	Chiefly sandstone	Low to medium.
Holston	Same	Sandstone and shale, some limestone	High.
		Colluvium consisting of material derived from—	
Hermitage	Undulating to hilly	Chiefly limestone	Medium to high.
Allen	Undulating to hilly	Sandstone and shale, some limestone	High.
Jefferson	Undulating to hilly	Same	High.
INTRAZONAL SOILS			
Rendzina soils:			
Hollywood	Undulating	Colluvium consisting of material derived from— Argillaceous limestone [3]	Medium.
Planosols:		Residuum from weathering of—	
Dickson	Undulating to rolling	Cherty limestone	Very high.
Lawrence	Nearly level to undulating	Cherty limestone	High.
Guthrie [4]	Nearly level	Cherty limestone	Very high.
Pearman	Undulating to rolling	Sandstone, shale, and limestone	Very high.
		Alluvium consisting of material derived from—	
Captina	Nearly level to undulating	Chiefly limestone, some sandstone, and shale.	Very high.
Taft	Nearly level	Same	High.
Robertsville [4]	Nearly level	Same	Very high.
Tupelo	Nearly level	Chiefly argillaceous limestone, in places some shale and sandstone.	Medium.
Wolftever [5]	Nearly level to undulating	Chiefly limestone, some shale and sandstone.	Medium.
Monongahela	Nearly level	Chiefly sandstone and shale, some limestone.	Very high.
Tyler [4]	Nearly level	Same	Very high.

See footnotes at end of table.

TABLE 5.—*Soils of Madison County, Ala., classified by higher categories, and the relief, parent material, and horizon differentiation for each*—Continued

AZONAL

Great soil group and series [1]	Relief	Parent material	Degree of horizon differentiation
Lithosols:[6]			
		Residuum from weathering of—	
Bodine	Rolling to steep	Very cherty limestone	Low.
Muskingum	Hilly to steep	Sandstone, some shale	Low.
Dowellton	Nearly level to undulating	Argillaceous limestone	Low.
Colbert [7]	Nearly level to rolling	Argillaceous limestone	Low to medium.
		Local alluvium consisting of material derived from—	
Alluvial soils:[8]			
Abernathy	Nearly level to gently sloping	High-grade limestone	Very low.
Greendale	Same	Cherty limestone	Low.
Ooltewah	Nearly level	Limestone	Low.
Guthrie [4] [9]	Nearly level	Limestone	Low to high.
Lickdale [4]	Nearly level to gently sloping	Sandstone, some shale [10]	High.
		General alluvium consisting of material derived from—	
Huntington	Nearly level	Limestone	Very low.
Egam	Nearly level	Limestone	Very low.
Lindside	Nearly level	Limestone	Low.
Melvin [4]	Nearly level	Limestone	Low.
Ennis	Nearly level	Cherty limestone	Very low.
Lobelville	Nearly level	Cherty limestone	Low.
Lee	Nearly level	Cherty limestone	Low.
Dunning [11]	Nearly level	Argillaceous limestone	Low.
Hamblen	Nearly level	Sandstone, shale, and limestone	Low.
Prader [4]	Nearly level	Same	Low.
Bruno	Gently undulating	Chiefly sandstone	Low.

[1] For a discussion of natural classification, description of higher categories, and genesis of series, see soil survey reports for Limestone County or Jackson County, Ala., and the 1938 Yearbook of Agriculture (*6*).

[2] Mottled subsoil. Red-Yellow Podzolic grading toward Planosol.

[3] Partly colluvium, partly residuum.

[4] Gley layer present.

[5] Weak Planosol grading toward Red-Yellow Podzolic.

[6] The following six miscellaneous land types also classify as Lithosols: Rockland, limestone, steep; Rockland, limestone, hilly; Rockland, limestone, rolling; Stony rolling land, Talbott and Colbert soil material; Stony smooth land, Talbott and Colbert soil material; and Stony steep land, Muskingum soil material.

[7] The smoother parts grade toward Red-Yellow Podzolic.

[8] Stony colluvium, Jefferson and Colbert soil materials, also classifies as Alluvial.

[9] In this county, the Guthrie series includes both intrazonal and azonal profiles.

[10] Portions of the Lickdale soil classify as a weak Planosol with gley layer and consist of sandstone residuum.

[11] Dark surface soil and gley layer.

their subsoils are predominantly yellowish brown to a depth of about 22 inches. Below this depth the material is mottled. The Capshaw and Captina soils are permeable throughout the surface soils and subsoils. Their subsoils are friable to firm. The Captina soils have a brittle pan layer below the subsoil at a depth of about 22 inches; the Capshaw soils do not have this pan but the soil is mottled and less compact below a depth of about 22 inches. The Wolftever silt loams have compact or very firm subsoils. The Holston fine sandy loams are distinguished from the Capshaw soils by somewhat better drainage and more sandiness. They consist largely of material derived from sandstone and shale, whereas the Capshaw soils consist largely of material originating from limestone.

The Taft, Tupelo, and Monongahela soils are somewhat poorly drained. The subsoils have a pale or weak yellowish color and are usually mottled to within 6 or 8 inches of the surface. In places the surface soil is mottled. Taft silt loam consists largely of material derived from limestone. Its plow layer is permeable to moisture and roots, and its subsoil is slowly permeable. Tupelo silt loam soils consist mainly of material derived from clayey, or argillaceous, limestone. Accordingly, they have a very firm clayey subsoil. Monongahela fine sandy loam consists largely of materials derived from sandstone and shale, but some material from limestones is intermixed. Accordingly, it has a higher content of sand than the Taft soil.

The Robertsville and Tyler soils are poorly drained. They are characterized by gray surface soils and gray to mottled compact subsoils. These two soils are similar. The Robertsville silt loam, however, was derived from limestone, whereas the Tyler very fine sandy loam originated chiefly from sandstone and shale and a smaller mixture of limestone material.

Soils on old colluvial land (old local alluvium)

Colluvial lands are the sloping fans and benches at the base of slopes. They consist of a mixture of local alluvium and colluvium that has been washed or has sloughed from the higher lying adjacent slopes. The old colluvial land is on the higher fans or benches; the young colluvial land, in general, is along the drainageways leading from the higher adjacent upland.

The Hermitage, Allen, and Jefferson are all well-drained soils on old colluvial land. The Hermitage soils are reddish; they consist of material derived chiefly from limestone. In contrast, the Allen and Jefferson soils consist of material derived largely from sandstone. Where the adjacent upland slopes are underlain by a series of sandstone, shale, and limestone, however, the parent material of the Allen and Jefferson soils consists of a

mixture of these various rocks. The Allen soils are distinguished from the Jefferson soils by their browner surface layer and more reddish subsoil. Both are friable and permeable to roots and moisture.

The Hollywood silty clay soils are somewhat poorly drained. They consist of alluvial and colluvial material derived mainly from clayey, or argillaceous, limestone. They are distinguished by their dark color, high clay content, and less acid reaction than is characteristic of other soils on old colluvial land. Bedrock is at shallower depths than is characteristic of the Jefferson, Allen, and Hermitage soils.

Soils on young colluvial land (young local alluvium)

Soils formed on young colluvial land are those of the Abernathy, Greendale, Ooltewah, Guthrie, and Lickdale series. The Abernathy and Greendale soils are well drained. Both consist of material derived from limestone. The parent limestone of the Greendale soils, however, is more cherty or of lower grade than that from which the Abernathy soils originated.

The Ooltewah soils are moderately well drained to somewhat poorly drained; they are mottled to within 12 to 14 inches of the surface. Guthrie silt loam is distinguished by its poor drainage. It is characterized by a light-gray surface layer and a gray to mottled gray compact or very firm silty clay subsoil. Both the Ooltewah and Guthrie soils consist of material derived from limestone. The Lickdale soil is also poorly drained. This soil was derived largely from sandstone; it is associated with the Hartsells soils on the mountaintops in the eastern part of the county.

Soils on bottom lands (young general alluvium)

The bottom lands are flood plains or nearly level areas along streams that are subject to flooding. The material from which the soils in the bottom lands was derived has been carried there by streams. Its character depends largely upon the kinds of soils and the parent rocks from which it originated, the rate at which the water was moving when it was deposited, and the elevation above the water table. The soils on the bottom lands are young, as the material from which they are developing has not been in place long enough to permit the development of surface soil and subsoil layers.

The Huntington and Ennis soils are well drained and are predominantly brown. They are permeable to a depth of 2½ to 4 feet. The Huntington soils consist of material originated largely from high-grade limestone, whereas the Ennis soil was derived largely from cherty limestone.

The Lindside, Egam, Lobelville, and Hamblen soils are moderately well drained to somewhat poorly drained. They are mottled to within 12 inches of the surface. Lindside silty clay loam is a permeable soil derived largely from high-grade limestone. Egam silty clay loam is distinguished from the Lindside soil by a compact or very firm subsoil. The Lobelville silt loam is distinguished from the Lindside silty clay loam chiefly by texture, a lighter color, a lower level of fertility, and a variable amount of chert, as the soil was derived largely from cherty limestone. Hamblen fine sandy loam is distinguished from the Lindside silty clay loam because it is somewhat less fertile, has a more loamy texture, and is somewhat more permeable. It was derived largely from sandstone and shale material intermixed with a considerable amount of material from limestone.

The Melvin, Lee, Dunning, and Prader soils are poorly drained. They are characterized by grayish or mottled firm subsoils. The Melvin, Lee and Prader soils have gray surface layers, but the surface layer of the Dunning soil is dark grayish brown. Melvin silty clay loam was derived largely from high-grade limestone, whereas Lee silt loam was derived largely from cherty limestone. Prader fine sandy loam was derived largely from sandstone and shale material intermixed with some limestone material. Dunning silty clay consists largely of materials derived from clayey, or argillaceous, limestone; many of the areas are associated with or adjacent to areas of Hollywood soils.

Bruno loamy fine sand is excessively drained. It consists almost wholly of fine sand or loamy fine sand; the texture of this soil is the result of rapid stream flow at the time of deposition. This soil occupies positions on natural levees along the stream channels. The parent material originated from sandstone or is the sandy component of finer textured rocks separated out by stream action. This is one of the least extensive of the soils on stream bottoms.

Soil series, types, and phases

In the following pages the soils of Madison County and their relation to agriculture are described in detail. The acreage and proportionate extent of these mapping units are listed in table 6. The location and distribution of the soils are shown on the map that accompanies this report. Capability groups are explained on page 88.

Abernathy silt loam (0 to 2 percent slopes) (Ad).—This brown to dark reddish-brown soil consists of young local alluvium. It occupies nearly level gentle depressions and sinks in areas of Cumberland and Decatur soils. Some tracts occur in narrow strips or bands along the drainageways. Many areas have no outlet for surface runoff and consequently become temporarily ponded during heavy rains or wet seasons. Internal drainage is medium.

This is one of the most extensive soils in the county. Separate areas range from 1 to as much as 30 or 40 acres in size. They are widely distributed throughout the Decatur-Cumberland-Abernathy soil association. Some of the largest areas are in the southwestern part of the county, south and west of Madison.

Profile description:

0 to 8 inches, brown to dark reddish-brown mellow silt loam.
8 to 24 inches, dark reddish-brown to brownish-red friable silt loam to silty clay loam, somewhat firmer in place than the surface layer.
24 to 33 inches+, dark reddish-brown to brownish-red friable to firm silty clay loam that grades to silty clay; faintly mottled with shades of brown, red, and some gray, the mottling increasing with depth; depth to limestone bedrock is 8 to 12 feet in areas along the drains but is well over 25 feet in some of the sinks.

A few areas of this Abernathy soil have a fine sandy loam or loam texture in the upper 8 or 10 inches. Some patches have a subsoil that is sufficiently mottled to be similar to Ooltewah silt loam. In many places, the Abernathy silt loam grades to Huntington silt loam, a well-drained bottom soil that occurs along the larger streams.

Abernathy silt loam is one of the more fertile soils of the county (fig. 4). It is high in plant nutrients and organic matter, slightly acid, and permeable to roots and moisture. Its ability to hold moisture available to plants is high, compared to that of most of the other well-drained soils. Because of its relief and position, it is not subject to erosion. Instead, during heavy rains most of the acreage

TABLE 6.—*Acreage and proportionate extent of the soils mapped in Madison County, Ala.*

Soils	Area	Extent
	Acres	*Percent*
Abernathy cherty silt loam	1,222	0.2
Abernathy fine sandy loam	3,665	.7
Abernathy silt loam	30,540	6.0
Allen clay loam, severely eroded rolling phase	1,731	.3
Allen fine sandy loam:		
Undulating phase	407	.1
Eroded udulating phase	4,377	.9
Eroded rolling phase	1,313	.3
Allen stony fine sandy loam:		
Eroded undulating phase	153	(1)
Eroded rolling phase	719	.1
Eroded hilly phase	132	(1)
Baxter cherty silt loam:		
Undulating phase	1,120	.2
Eroded undulating phase	10,511	2.1
Rolling phase	1,374	.3
Eroded rolling phase	11,402	2.2
Hilly phase	280	.1
Eroded hilly phase	1,018	.2
Baxter cherty silty clay loam:		
Severely eroded undulating phase	458	.1
Severely eroded rolling phase	5,105	1.0
Severely eroded hilly phase	560	.1
Bodine cherty silt loam:		
Hilly phase	764	.1
Eroded hilly phase	438	.1
Steep phase	433	.1
Bruno loamy fine sand	244	(1)
Captina and Capshaw loams, undulating phases	499	.1
Captina and Capshaw silt loams:		
Level phases	4,215	.8
Undulating phases	1,252	.3
Colbert cherty silt loam, undulating phase	188	(1)
Colbert cherty silty clay loam:		
Eroded undulating phase	1,222	.2
Eroded rolling phase	1,558	.3
Colbert fine sandy loam, eroded undulating phase	468	.1
Colbert silt loam:		
Level phase	550	.1
Undulating phase	967	.2
Colbert silty clay loam:		
Eroded undulating phase	2,698	.5
Eroded rolling phase	789	.2
Cookeville silt loam:		
Undulating phase	2,779	.6
Eroded undulating phase	13,560	2.7
Eroded rolling phase	1,005	.2
Cumberland loam:		
Undulating phase	150	(1)
Eroded undulating phase	5,382	1.1
Eroded rolling phase	500	.1
Decatur and Cumberland silt loams:		
Level phases	2,688	.5
Undulating phases	11,524	2.3
Decatur and Cumberland silty clay loams:		
Eroded undulating phases	46,029	9.0
Eroded rolling phases	1,971	.4
Decatur and Cumberland silty clays:		
Severely eroded undulating phases	5,395	1.1
Severely eroded rolling phases	5,105	1.0
Gullied phases	1,731	.3
Dewey cherty silty clay:		
Severely eroded undulating phase	916	.2
Severely eroded rolling phase	1,354	.3
Dewey cherty silty clay loam:		
Eroded undulating phase	3,298	.7
Eroded rolling phase	2,275	.5
Dickson cherty silt loam:		
Undulating phase	3,410	.7
Eroded undulating phase	4,937	1.0
Rolling phase	1,171	.2
Eroded rolling phase	3,339	.7
Dickson silt loam:		
Level phase	2,036	0.4
Undulating phase	12,216	2.4
Eroded undulating phase	5,930	1.2
Dowellton silt loam	148	(1)
Dunning silty clay	695	.1
Egam silty clay loam	1,832	.4
Ennis silt loam	3,156	.6
Etowah cherty silt loam, undulating phase	509	.1
Etowah loam:		
Level phase	305	.1
Undulating phase	764	.1
Eroded undulating phase	373	.1
Etowah silt loam:		
Level phase	1,273	.3
Undulating phase	2,749	.5
Etowah silty clay loam:		
Eroded undulating phase	2,659	.5
Eroded rolling phase	97	(1)
Greendale cherty silt loam	3,716	.7
Greendale silt loam	10,455	2.1
Guthrie silt loam	11,218	2.2
Hamblen fine sandy loam	1,893	.4
Hartsells fine sandy loam:		
Undulating phase	1,349	.3
Eroded undulating phase	305	.1
Rolling phase	4,072	.8
Eroded rolling phase	825	.2
Undulating shallow phase	244	(1)
Eroded undulating shallow phase	214	(1)
Rolling shallow phase	1,018	.2
Eroded rolling shallow phase	255	.1
Hermitage cherty silt loam:		
Eroded undulating phase	2,688	.5
Rolling phase	356	.1
Eroded rolling phase	6,271	1.2
Eroded hilly phase	3,624	.7
Hermitage cherty silty clay loam, severely eroded rolling phase	789	.2
Hermitage silt loam:		
Undulating phase	814	.2
Eroded undulating phase	1,547	.3
Eroded rolling phase	326	.1
Hollywood silty clay	2,400	.5
Hollywood silty clay, eroded undulating phase	226	(1)
Holston fine sandy loam:		
Level phase	2,647	.5
Undulating phase	1,425	.3
Eroded undulating phase	1,222	.2
Humphreys cherty silt loam	3,156	.6
Humphreys silt loam	2,698	.5
Huntington fine sandy loam	1,222	.2
Huntington silt loam	4,785	.9
Jefferson fine sandy loam:		
Undulating phase	682	.1
Eroded undulating phase	1,298	.3
Eroded rolling phase	153	(1)
Jefferson stony fine sandy loam, eroded rolling phase	253	(1)
Lawrence silt loam	4,581	.9
Lee silt loam	5,294	1.0
Lee-Lobelville cherty silt loams	2,494	.5
Lee-Lobelville silt loams	2,850	.6
Lickdale silt loam	46	(1)
Lindside silty clay loam	13,947	2.7
Linker fine sandy loam, eroded undulating phase	204	(1)
Made land		(1)
Melvin silty clay loam	15,097	3.0
Monongahela fine sandy loam	3,354	.7
Muskingum fine sandy loam, hilly phase	458	.1
Muskingum stony fine sandy loam:		
Hilly phase	2,031	.4
Steep phase	560	.1

See footnote at end of table.

TABLE 6.—*Acreage and proportionate extent of the soils mapped in Madison County, Ala.*—Continued

Soils	Area	Extent
	Acres	*Percent*
Ooltewah fine sandy loam	1, 955	0. 4
Ooltewah silt loam	9, 467	1. 9
Pearman loam	265	. 1
Pits:		
Clay	--------	(1)
Gravel	--------	(1)
Prader fine sandy loam	1, 018	. 2
Robertsville silt loam	7, 991	1. 6
Rockland, limestone:		
Steep	69, 453	13. 6
Hilly	12, 216	2. 4
Rolling	2, 800	. 6
Sequatchie fine sandy loam	1, 222	. 2
Sequatchie fine sandy loam, eroded phase	1, 731	. 3
Stony colluvium, Jefferson and Colbert soil materials	234	(1)
Stony rolling land, Talbott and Colbert soil materials	3, 207	. 6
Stony smooth land, Talbott and Colbert soil materials	509	. 1
Stony steep land, Muskingum soil material	6, 744	1. 3
Taft silt loam	774	. 2
Talbott cherty silty clay, severely eroded rolling phase	316	. 1
Talbott cherty silty clay loam:		
Eroded undulating phase	1, 043	. 2
Eroded rolling phase	1, 731	. 3
Talbott fine sandy loam:		
Eroded undulating phase	188	(1)
Eroded rolling phase	153	(1)
Talbott silty clay loam:		
Eroded undulating phase	1, 726	. 3
Eroded rolling phase	224	(1)
Talbott-Colbert cherty silty clay loams, eroded hilly phases	654	. 1
Tupelo silt loam	6, 729	1. 3
Tupelo silt loam, overwash phase	804	. 2
Tyler very fine sandy loam	4, 785	. 9
Wolftever silt loam	560	. 1
Wolftever silt loam, eroded phase	366	. 1
Total land area	509, 560	--------
Water (Wheeler Reservoir)	4, 360	--------
Total area of the county	513, 920	100. 0

[1] Less than 0.1 percent.

receives small deposits of local alluvium from adjacent uplands.

Use suitability.—Practically all of this soil is used for crops. On much of the acreage, row crops are grown successively for many years. Fertility, favorable moisture, good drainage, and smooth surface make this soil particularly suitable for intensive use for many crops (fig. 5). Corn is probably the most extensively grown, but the cotton acreage is large, and lespedeza, oats, soybeans, and sorghum are common. A small acreage is pastured.

Because of the abundant moisture, this soil will produce good yields if fertility is maintained at a high level. Yields are high for all crops commonly grown. The soil is well suited to practically all hay crops, including alfalfa. Oats and other small grains usually lodge. Cotton produces best during the drier years; at other times the crop fruits poorly, and boll weevil infestation is sometimes very bad. Some of the higher areas of this soil, which are not flooded so frequently, are somewhat better suited to cotton than most of the acreage and are desirable for gardens.

The plentiful moisture makes the soil particularly good

Figure 4.—An excellent crop of soybean hay on Abernathy silt loam

for late summer grazing; pasture grasses and legumes remain palatable longer during dry weather than on most of the upland soils.

It is not so necessary to plant winter legumes as cover crops on this soil as it is on many others, because the soil is not subject to erosion and its supply of plant nutrients and organic matter is already high. Also, the excessive moisture during the winter months is unfavorable for these crops. Use and management methods are discussed in group 1 in the section Use and Management of Soils.

Abernathy cherty silt loam (0 to 2 percent slopes) (AB).—Chert fragments in this soil interfere materially with tillage. Some areas occur on very gentle slopes along drains, and others occupy very gentle fans below cherty Baxter and Dewey soils. Some of the acreage is temporarily flooded during heavy rains. The soil is widely distributed over the central part of the county, but most tracts are less than 10 acres in size.

The surface layer to a depth of 8 inches is brown to dark reddish-brown cherty silt loam. The subsoil is dark reddish-brown to brownish-red cherty silt loam grading to silty clay loam. Below 24 to 30 inches, the soil is slightly mottled, the mottling increasing with depth. Depth to bedrock ranges from 8 to 20 or 30 feet. In areas adjacent to Colbert and Talbott soils, the subsoil is more clayey plastic material.

This soil is fertile, and it has a good supply of organic matter. It is slightly acid. Tilth is good, and moisture is adequate for many crops. Permeability is moderately rapid, and internal drainage is medium. Although chert interferes with tillage, the soil is not hard to work or to conserve.

Figure 5.—Dairy cattle grazing good pasture. Abernathy silt loam is a fertile soil.

Use suitability.—Practically all of this soil is cropped. Row crops in particular are grown extensively. Corn is probably the most extensive; other important crops are cotton, soybeans, grain sorghum, and hay crops such as soybeans and lespedeza. Like Abernathy silt loam, this soil is suited to intensive use. The number of crops for which it is well suited, however, is restricted. Small grains tend to lodge, fall-sown crops may be damaged by excess water during the winter, and sometimes cotton does not fruit well. The soil is desirable for pasture because the abundant moisture is favorable for legumes and grasses during the drier parts of the growing season. Use and management methods are discussed in group 1 in the section Use and Management of Soils.

Abernathy fine sandy loam (0 to 2 percent slopes) (Ac).—This brownish soil consists of local alluvium derived mainly from limestone mixed with sandy material from such associated soils as Cumberland loam and Allen fine sandy loam. It occurs in gentle depressions or drainheads. During heavy rains, much of the acreage is flooded temporarily, but a few areas have outlets to drain off surface water. Most of this soil is in the southwestern part of the county near Madison and west of Triana.

Profile description:

0 to 8 inches, grayish-brown to reddish-brown fine sandy loam.
8 to 24 inches, grayish-brown to reddish-brown friable fine sandy loam that grades to fine sandy clay loam; much of this layer may be stratified, the strata differing from one another in color and texture.
24 inches +, very dark grayish-brown firm fine sandy clay to silty clay; depth to limestone bedrock usually more than 8 feet.

The texture of the surface layer ranges from a coarse fine sandy loam to loam. Depths to the darker firmer layer range from 18 to 28 or 30 inches. This darker layer consists of an older surface soil that was buried by later deposits.

Abernathy fine sandy loam has moderate natural fertility. It has a somewhat lower organic-matter content than Abernathy silt loam. The soil is slightly acid to medium acid. Permeability is moderately rapid, and the soil is friable. Internal drainage is medium, and adequate moisture is stored for most of the common crops.

Use suitability.—Practically all of this soil is in crops or pasture. Corn and, to a lesser extent, cotton are the chief crops, but some acreage is planted to small grains and hay. Yields are fairly high, although fertilizers are not used so extensively as on the average upland soils.

This soil responds well to fertilizer, and it is easily worked and conserved. It is well suited to intensive use for such crops as corn and soybeans. Areas that are not so subject to temporary flooding are suitable for alfalfa and truck crops. Hay does well, but a good sod may be more difficult to establish and maintain than on Abernathy silt loam. This soil is particularly suitable for crops that need abundant moisture during the drier parts of the growing season. Use and management methods are discussed under group 1 in the section Use and Management of Soils.

Allen fine sandy loam, undulating phase (2 to 6 percent slopes) (Am).—This reddish soil is on old mixed colluvium originating from sandstone, shale, and limestone. Separate areas are small and usually occur in association with more sloping Allen soils. The soil generally occupies the highest part of the colluvial slopes in the Allen-Jefferson soil association. It is located chiefly in Big Cove, southeast of Huntsville.

Profile description:

0 to 7 inches, grayish-brown to reddish-brown fine sandy loam.
7 to 13 inches, grayish-brown to reddish-brown friable fine sandy clay loam.
13 to 25 inches, reddish-brown to yellowish-red firm fine sandy clay that breaks to subangular nutlike pieces; below depths of 13 to 25 inches the material may be reddish brown or brownish red, in some places grading to a lighter color that is somewhat variegated or mottled with yellow; limestone bedrock is at depths of 3 to 8 feet or more.

Limestone or sandstone fragments occur in some areas, especially on the surface. In some fields they have been picked up and piled along the fences. A few patches of this soil are eroded but are too small to be significant.

A few small areas of Abernathy fine sandy loam are included with this soil as mapped.

Allen fine sandy loam, undulating phase, is medium to strongly acid. Its supply of organic matter is not so large as in such soils as Abernathy silt loam or Decatur silty clay loam, but it is somewhat greater than that common to the associated Jefferson soils. The supply of plant nutrients is moderate. The surface soil has good tilth; the subsoil, although firm, is permeable to moisture and roots. Internal drainage is medium, and the subsoil has a moderate capacity for holding moisture available to plants.

Use suitability.—Practically all of this soil is cropped. Cotton, corn, cowpeas, soybeans, and lespedeza are the principal crops. Usually yields are moderate. Row crops in particular are fertilized regularly. No consistent rotations are followed; and winter-legume cover crops are usually not grown.

This soil is suitable for the usual crops. The more sloping areas are subject to some erosion, and consistent fertilization is necessary for high productivity because the supply of plant nutrients is moderate.

Under a high level of management, the soil will support 3- or 4-year rotations in which small grains or legumes and grass-hay crops are grown for 2 or 3 years. In addition to the crops now grown extensively, the soil is well suited to sorghum, small grains, and various legumes and grasses. It is also suitable for pasture if it is built up to a fairly high level of fertility. For a discussion of use and management, see group 4 in the section Use and Management of Soils.

Allen fine sandy loam, eroded undulating phase (2 to 6 percent slopes) (An).—Although similar to the undulating phase of Allen fine sandy loam, this soil has lost about half of its surface soil through erosion. The amount of erosion varies according to slope and past management.

This is the most extensive of the Allen soils. It occupies positions on the higher parts of colluvial slopes directly below steep mountain areas. Practically all of it occurs in the Allen-Jefferson soil association. Some of the larger tracts are located in the south-central part of the county south of Huntsville.

The 5- to 6-inch plow layer is generally reddish-brown fine sandy loam. The subsoil is predominantly reddish-brown to yellowish-red friable to firm fine sandy clay loam. At depths below 60 to 70 inches, this material is lighter colored and gradually becomes reddish yellow splotched with yellow and gray. Generally the depths to limestone bedrock range from 4 to 8 feet, but rock may be at a depth of 2½ feet in some places.

Many patches have lost practically all of the surface soil. In these the plow layer consists of reddish-brown fine sandy clay loam or clay loam that has a few small gullies in places. In some areas limestone and sandstone fragments occur.

Allen fine sandy loam, eroded undulating phase, has

medium internal drainage. It is medium to strongly acid. The surface soil has fairly good to good tilth, and the subsoil is permeable to roots and moisture. Except in the more severely eroded patches, where the moisture supply is limited, the soil has a moderate capacity for holding moisture available to plants. Erosion is a hazard on the more sloping areas if the soil is not well protected by a cover crop.

Use suitability.—All of the soil has been cropped at some time. Except for that part that lies within the arsenal areas south of Huntsville, most of it is now cropped or in pasture. Cotton and corn are among the most extensive crops, but small grains, soybeans, grain sorghum, and lespedeza and other hay crops are grown on some of the acreage.

This soil is well suited to tilled crops. Because of its moderate fertility and moderate slopes, however, it requires careful maintenance of fertility and control of runoff. Moderate rotations can be used in which close-growing crops such as small grains and hay are grown 2 or 3 years in a 3- or 4-year rotation. Fertilizers must be applied regularly if fertility is to be kept at a high level. Use and management methods are discussed under group 4 in the section Use and Management of Soils.

Allen fine sandy loam, eroded rolling phase (6 to 12 percent slopes) (Ao).—This phase differs from the undulating phase of Allen fine sandy loam in having a stronger slope and significant soil loss through erosion. As a result of this loss, the present plow layer usually consists of a mixture of surface soil and former subsoil material.

Most areas of this soil are of moderate size. They occupy positions on the colluvial slopes directly below and adjacent to the steep mountain slopes. They usually occur in the Allen-Jefferson soil association.

The plow layer to a depth of 5 or 6 inches is reddish-brown fine sandy loam. The subsoil is reddish-brown to yellowish-red firm fine sandy clay loam. At depths of 50 to 60 inches the soil generally grades to a reddish-yellow or predominantly yellowish material, splotched or mottled with light yellow or gray. Depth to limestone bedrock usually ranges from about 2 to 7 feet but in some places may be much greater.

Some patches, especially on the stronger slopes, have lost practically all the surface soil through erosion. In these areas the plow layer consists of reddish-brown firm fine sandy clay loam that may be cut by small shallow gullies. Limestone and sandstone fragments occur in some areas.

Allen fine sandy loam, eroded rolling phase, is a moderately fertile soil, but the content of organic matter is fairly low. It is medium to strongly acid. Tilth is good in the plow layer where erosion has not been so active, but is poor in severely eroded areas. If the eroded areas are too wet when cultivated, the soil puddles; if they are too dry, it breaks into hard lumps. Although the subsoil is firm, it is permeable to roots and moisture.

Because of the rather strong slope, erosion is active if the soil is not protected by a close-growing vegetative cover. Internal drainage is medium, and the soil has a moderate capacity for holding moisture available to plants. The more eroded areas, however, are inclined to be droughty.

Use suitability.—All of this soil has been cultivated at some time, but at present only about 65 percent is in crops. Most of the rest is pastured, but a small part has reverted to forest. Cotton is the main crop, but corn, cowpeas, soybeans, lespedeza, and sorghum are also important. Yields are only moderate. Fertilizer is usually applied if row crops are to be grown. Lime has been added to much of the soil. As a rule, crops are not rotated consistently.

This soil is suited to practically all of the crops commonly grown in the county, including cotton, corn, small grains, and the more exacting legumes and grasses for hay and pasture. It has good workability but is eroded by surface runoff in cultivated areas. Where erosion is severe, tillage causes the soil to puddle when too wet and to break into hard lumps when too dry. Rotations of moderate length that consist mainly of close-growing crops are needed to provide a protective plant cover. Use and management methods are discussed under group 11 in the section Use and Management of Soils.

Allen clay loam, severely eroded rolling phase (6 to 12 percent slopes) (Al).—Most areas of this severely eroded soil are small. They occupy the stronger slopes in areas of rolling Allen soils and are distributed throughout the Allen-Jefferson soil association. The most extensive acreage is at Big Cove southeast of Huntsville.

The 5- to 6-inch plow layer consists of reddish-brown clay loam. The subsoil is reddish-brown to yellowish-red friable to firm fine sandy clay loam to clay loam. Below approximately 36 inches, the soil grades to a lighter color splotched or variegated with yellow and some gray. Limestone bedrock is usually at 1½ to 6 feet but occurs at greater depths in some areas.

In places, part of the subsoil has been eroded away, and some patches have small shallow gullies. Limestone and sandstone fragments occur in some areas.

Allen clay loam, severely eroded rolling phase, has low fertility, and its content of organic matter is small. It is medium to strongly acid. Tilth is poor in the surface layer. The soil is moderately permeable to roots but has a slow infiltration rate. Capacity for holding moisture available to plants is low so that the soil is generally droughty.

Use suitability.—All of this soil has been cropped at some time, but only a small part is now cultivated. Much of it is idle or is pastured. About 25 percent of the soil has reverted to forest, chiefly pines. Crops are mainly cotton and corn, but some lespedeza and other hay crops are grown. Generally, yields are rather low; some of the soil is cropped for 1 or 2 years and then allowed to lie idle for 3 or 4 years.

This soil is suitable for tilled crops, but its low fertility, poor tilth, unfavorable moisture, and susceptibility to erosion are limiting factors. Most of it requires long rotations that consist principally of close-growing small grains, hay, and pasture. Because of inadequate moisture, the grazing capacity of the soil is very limited, especially during the drier parts of the year. Use and management methods are discussed under group 12 in the section Use and Management of Soils.

Allen stony fine sandy loam, eroded undulating phase (2 to 6 percent slopes) (Ap).—This is a reddish well-drained soil. Throughout its profile are limestone and sandstone fragments that interfere with field work. The soil consists of old local alluvium and colluvium derived mainly from sandstone and shale intermixed with some limestone. Much of its original surface layer has been lost through erosion.

Most areas occupy positions on the higher parts of the Allen landscapes and are associated with rolling Allen

and Jefferson soils. The acreage is not extensive. Separate areas are small and are widely distributed throughout the Allen-Jefferson soil association.

The 5- to 6-inch plow layer usually consists of a mixture of the original surface soil and subsoil and is predominantly reddish-brown stony fine sandy loam. The subsoil is reddish-brown to yellowish-red friable to firm stony fine sandy clay loam to stony clay loam that grades to a lighter color at depths below 36 inches. Limestone bedrock is usually at 2½ to 8 feet.

In a few patches all of the surface soil has been lost. In these areas the plow layer consists of reddish-brown firm but friable clay loam in which there are a few small gullies.

Allen stony fine sandy loam, eroded undulating phase, has a moderate supply of plant nutrients and organic matter. The soil is medium to strongly acid. Internal drainage is medium. The soil is permeable to roots and moisture. Except in the most severely eroded places, which are rather droughty, tilth of the plow layer is fairly good. The soil has a moderate capacity for holding moisture available to plants. It is not particularly subject to erosion, except on the more sloping areas.

Use suitability.—Practically all of this soil is cultivated at the present time. Corn, cotton, and soybeans are the principal crops. Some fertilizers are used where row crops are to be grown, and lime has been applied to much of the acreage. Crop yields are moderate.

The soil is suitable for cultivated crops, but the stones interfere materially with field work, especially with cultivation and mowing. It is well suited to corn, cotton, sorghum, and such truck crops as tomatoes and melons. Moderately short rotations can be used, but careful management is required. Use and management methods are discussed under group 4 in the section Use and Management of Soils.

Allen stony fine sandy loam, eroded rolling phase (6 to 12 percent slopes) (Ar).—This phase differs from the eroded undulating phase of Allen stony fine sandy loam mainly in having stronger slopes. It is the most extensive of the Allen stony soils. Separate areas are small and are associated with undulating and rolling Allen and Jefferson soils. Many areas occupy positions directly below the steep, stony mountain slopes; all are in the Allen-Jefferson soil association area.

The plow layer consists of a mixture of the original surface soil and subsoil. It is predominantly reddish-brown stony fine sandy loam or loam. The subsoil is reddish-brown to yellowish-red friable to firm stony sandy clay loam to clay loam that grades to lighter colored material below a depth of 3 or 4 feet. Limestone bedrock is usually at about 2 to 7 feet but is deeper in a few places.

In patches where all of the surface soil has been removed by erosion, the plow layer consists of reddish-brown firm sandy clay loam or clay loam. In such areas a few small gullies may occur.

The supply of plant nutrients and content of organic matter in Allen stony fine sandy loam, eroded rolling phase, are moderate to low. The soil is medium to strongly acid. Tilth of the plow layer ranges from moderate to fair, and the soil is permeable to roots and moisture. The more eroded patches, however, have poor tilth and a very limited capacity for holding moisture available to plants. Erosion is a great hazard in cultivated areas.

Use suitability.—Although all of this soil has been cleared and was cropped at some time, less than 60 percent is now used for crops. Much of the rest is idle or has reverted to forest, which is mostly pine. Areas that are not cropped are sometimes pastured but usually have not been improved. Cotton and corn, the chief crops, are sometimes fertilized, but yields are usually not high.

Although the soil is suitable for most crops commonly grown, its stoniness and strong slope limit its use. Fairly long rotations are necessary. Stones interfere greatly with tillage and mowing. If properly fertilized and seeded, the soil can be used for permanent pasture. Use and management methods are discussed under group 11 in the section Use and Management of Soils.

Allen stony fine sandy loam, eroded hilly phase (12 to 20 percent slopes) (As).—Individual areas of this soil are small, and the total acreage is not large. The soil occupies the stronger slopes in association with Allen and Jefferson soils in the Allen-Jefferson soil association.

The amount of erosion varies greatly. Much of the acreage is so eroded that the plow layer now consists of a mixture of the original surface soil and subsoil; this 5- to 6-inch layer is reddish-brown stony fine sandy loam. The subsoil is predominantly reddish-brown to yellowish-red stony fine sandy loam or stony clay loam. Limestone bedrock is at depths of 1½ to 6 feet or more. Limestone and sandstone fragments are abundant enough to interfere materially with cultivation and mowing. Small gullies are common in some areas, especially on the stronger slopes.

A few areas have lost only a small amount of the surface soil. On these the surface 6 or 8 inches is grayish-brown stony fine sandy loam. Some patches have lost all of the surface soil and part of the subsoil through erosion. In such areas the 5- to 6-inch plow layer consists of red or reddish-brown friable to firm stony clay loam.

Allen stony fine sandy loam, eroded hilly phase, is moderately fertile and has a moderate content of organic matter. It is medium to strongly acid. Tilth of the plow layer varies greatly. It is good in places that are not so eroded, but poor in the more eroded patches because the soil is clayey. This soil is generally permeable to moisture and roots. Internal drainage is medium. Capacity for holding moisture available to plants varies. It is moderate in most places, but the soil does not hold water well in the more eroded areas and is droughty. This soil may erode badly if it is cultivated.

Use suitability.—Much of this soil is in unimproved pasture, although all of it has been cropped at some time. Some areas are abandoned or idle, and some have reverted to forest, which is mainly pine. The strong slopes and stoniness make the soil somewhat poorly suited to tilled crops. Under proper management, however, it will support good permanent pasture. Sericea lespedeza and kudzu are desirable as a permanent cover if the soil is to be rebuilt. Use and management methods are discussed under group 13 in the section Use and Management of Soils.

Baxter cherty silt loam, undulating phase (2 to 6 percent slopes) (Ba).—This is an upland soil that developed from cherty limestone. It has good drainage. Most areas are associated with the Cookeville, Dickson, and Bodine soils of the gray-lands part of the county. Some acreage is associated with Dewey soils in a belt extending south from the Alabama-Tennessee line, north of Plevna, to a point along the Flint River and west of Maysville.

Like other Baxter soils, this soil is distinguished from the Cookeville soils by its more cherty and lighter colored surface soil and subsoil. It is distinguished from the Dickson soils by its reddish rather than yellowish subsoil and by the lack of the siltpan common to the Dickson soils. In general, those parts of the landscape occupied by the Baxter soils are more rolling than those occupied by the Dickson and Cookeville soils and are commonly closer to the drainageways. Baxter cherty silt loam, undulating phase, is distinguished by its gentle slope.

Profile description:

0 to 7 inches, grayish-brown friable cherty silt loam; areas that have not been cultivated have a 1- or 2-inch surface layer that is darker because its organic-matter content is higher; chert comprises from 15 to 30 percent of this layer, enough to interfere materially with cultivation; most chert fragments range from ¼ to about 3 inches in diameter, but some are larger.
7 to 12 inches, light yellowish-brown to brown friable cherty silt loam that grades with depth to cherty silty clay loam.
12 to 48 inches, yellowish-red firm cherty silty clay or clay; lower part faintly mottled with gray and reddish brown.
48 inches +, splotched or mottled red, yellow, and gray firm to very firm cherty clay; depth to cherty limestone bedrock ranges from 10 to 40 feet.

The content of plant nutrients and organic matter is low to moderate, and the soil is medium to strongly acid. The surface layer has good tilth. Although the chert fragments interfere with tillage, they make the soil more permeable. The soil is permeable to roots and moisture, and it has a moderate capacity for holding moisture available to plants.

Use suitability.—About one-fourth of the acreage is still under native forest. Much of the rest is now cropped. Cotton, corn, and hay are the chief crops, and pasture is important.

The gentle relief, good tilth, moderate permeability, and favorable response to good management make this soil fairly desirable for crops and pasture. It needs consistent and rather heavy fertilization, however, to maintain high yields. It is suited to practically all the crops commonly grown, including cotton, corn, small grains, sorghum, soybeans, and various legumes and grasses for hay and pasture. It is a warm soil and therefore favorable for early truck crops and cotton. Use and management methods are discussed under group 3a in the section Use and Management of Soils.

Baxter cherty silt loam, eroded undulating phase (2 to 6 percent slopes) (Bʙ).—This is one of the most extensive of the Baxter soils. It consists of areas from which a significant amount of the original surface soil has been eroded. The soil is usually associated with Cookeville and Dewey soils in the Baxter-Cookeville-Dewey soil association. A few smaller areas are in the Dickson-Lawrence association.

The plow layer now consists of a mixture of original surface soil and subsoil and is brownish or reddish-yellow cherty silt loam. The subsoil is firm yellowish-red cherty silty clay loam, which grades to cherty silty clay. At depths below about 40 inches, the soil is very firm cherty clay splotched or mottled with yellow, red, and gray. Limestone bedrock occurs at depths ranging from 10 to 40 feet.

Some small patches have lost most of their surface layer. In these areas the plow layer consists of yellowish-red cherty silty clay loam or cherty silty clay.

Baxter cherty silt loam, eroded undulating phase, has a moderately low supply of plant nutrients and organic matter. Internal drainage is medium. The soil is permeable to roots and moisture; tilth is usually fairly good. Throughout the entire profile, the soil is medium to strongly acid. Capacity for holding moisture available to plants is moderate. Erosion is a hazard, especially on the more sloping areas, and a few small gullies occur, most of which are represented on the soil map by symbol.

Use suitability.—All of this soil has been cropped at some time, and most of it is cropped at present. Cotton and corn are the principal crops, and moderate yields are obtained under usual management. Mixed fertilizer is commonly used for cotton. Part of the soil is used for hay and pasture. Lespedeza is the most common of the hay crops.

The smooth surface, fairly good tilth, moderately favorable moisture, and response to good management make this a fairly desirable soil for crops and pasture. Chert interferes with tillage, and erosion has impaired tilth and diminished moisture-holding capacity to some extent. This soil, like the undulating phase of Baxter cherty silt loam, warms early in spring. Consequently, it is favorable for growing cotton and certain truck crops for early market. Use and management are discussed under group 3a in the section Use and Management of Soils.

Baxter cherty silty clay loam, severely eroded undulating phase (2 to 6 percent slopes) (Bɢ).—This severely eroded soil occupies single slopes in close association with other Baxter soils. Almost all areas are in the Baxter-Cookeville-Dewey soil association. They are small in size and total area.

The 5- to 6-inch plow layer is yellowish-red very firm cherty silty clay. The subsoil resembles the surface layer. Below depths of 36 to 40 inches, the soil is a splotched or mottled red, yellow, and gray cherty clay. Cherty limestone bedrock is at depths of 10 to 40 feet. Some small gullies occur, but they can be filled by using ordinary tillage implements.

Content of organic matter is very low. Tilth of the plow layer is poor; the soil is hard when dry, and it is plastic if worked too wet. Moisture infiltrates slowly, and the capacity for holding moisture available to plants is very low. The soil is medium to strongly acid.

Use suitability.—At present only about 40 percent of this soil is in crops, although all of it has been cleared and was cropped at some time. Cotton, corn, cowpeas, and other field crops are commonly grown. Much of the soil is idle part of the time and cropped intermittently. A part of it is in unimproved pasture. Yields under usual conditions are low.

Poor tilth, inadequate moisture, and low productivity make this one of the less desirable soils for crops. It can be improved by increasing the supply of plant nutrients and organic matter and by planting close-growing legumes and grasses instead of row crops. It is well suited to small grains, hay, and pasture. Use and management are discussed under group 12 in the section Use and Management of Soils.

Baxter cherty silt loam, rolling phase (6 to 12 percent slopes) (Bc).—This well-drained light-red soil has developed over cherty limestone. It is not so extensive as many of the other Baxter soils. Areas are usually small and are widely distributed throughout the Baxter-Cookeville-Dewey soil association. A few areas may occur along the southeastern edge of the Dickson-Lawrence soil association.

Profile description:

0 to 7 inches, grayish-brown cherty silt loam.
7 to 12 inches, light yellowish-brown to brown friable cherty silt loam that grades to cherty silty clay loam with depth.
12 to 40 inches, yellowish-red firm cherty silty clay that grades to weakly mottled material.
40 inches +, splotched or mottled red, yellow, and gray firm to very firm cherty clay; limestone bedrock is at depths of 8 to 36 feet.

This medium to strongly acid soil has a moderate supply of plant nutrients and organic matter. Although there is enough chert in the surface soil to interfere materially with cultivation and mowing, the soil has good tilth and or the whole is permeable to moisture and roots. Internal drainage is medium. The soil has a moderate capacity for holding moisture available to plants.

Use suitability.—Most of this soil is under native forest, but its favorable tilth, good internal drainage, and ability to respond to good management make it suitable for cultivated crops. Because of rather strong slopes and moderately low fertility, however, it must be carefully managed in order to maintain productivity. Under good management rotations of moderate length can be used. The soil is suitable for practically all of the usual crops, such as cotton, corn, small grains, sorghum, and soybeans and the commonly grown legumes and grasses for hay or pasture. Use and management are discussed under group 9 in the section Use and Management of Soils.

Baxter cherty silt loam, eroded rolling phase (6 to 12 percent slopes) (BD).—This is the most extensive of the Baxter soils; many of the areas are large enough to dominate the landscape. Much of this soil is in the Baxter-Cookeville-Dewey soil association.

The 5- to 6-inch plow layer is brownish-yellow to reddish-yellow cherty silt loam. The subsoil is yellowish-red cherty silty clay loam or cherty silty clay that grades with depth to mottled or splotched material. Limestone bedrock is at depths of 8 to 36 feet.

Patches of this soil, especially on the stronger slopes, are so eroded that all of the original surface soil has been lost. In these areas the plow layer consists of yellowish-red cherty silty clay loam or cherty silty clay subsoil. The chert is so abundant as to interfere materially with cultivation; the larger fragments make the use of harvesting implements difficult. Many of the chert fragments, however, can be picked up and the soil thus made more suitable for general cropping.

Baxter cherty silt loam, eroded rolling phase, is low in content of organic matter and plant nutrients and is medium to strongly acid. Tilth of the plow layer varies according to the amount of original surface soil lost. It is poor on the more eroded areas and good on those less eroded. Most of the soil has moderate internal drainage and is permeable to roots and moisture. Its capacity for holding moisture available to plants is moderate, except on the more eroded areas, where it is very low. Erosion is a great hazard if the soil is tilled.

Use suitability.—All of this soil has been cropped at some time. At present about 65 percent of it is used for crops. Much of the rest is in unimproved permanent pasture, and some is idle. Cotton, corn, and lespedeza are the principal crops grown. Although much of this soil is farmed continuously, a considerable acreage is planted to corn or cotton for 1 or 2 years, and that crop followed by lespedeza for hay or pasture for 2 or 3 years. The soil is then allowed to remain idle for 1 to 3 years. Some fertilizers are added if row crops are to be grown, particularly cotton.

This soil is suitable for tilled crops but its strong slope, chertiness, and somewhat low fertility limit its suitability for this purpose. It is suited to the wide variety of crops that is commonly grown—cotton, corn, small grains, and the usual legumes and grasses for hay and pasture. Rather long rotations and adequate fertilization are needed if the soil is to remain productive. Use and management are discussed under group 9 in the section Use and Management of Soils.

Baxter cherty silty clay loam, severely eroded rolling phase (6 to 12 percent slopes) (BH).—Areas of this soil range from 5 to 30 acres in size. They are widely scattered throughout the Baxter-Cookeville-Dewey soil association. Some acreage is in the Dickson-Lawrence association.

The 5- to 6-inch plow layer is usually yellowish-red cherty silty clay loam but in places is cherty silty clay. The subsoil is yellowish-red cherty silty clay. Below about 36 inches, the soil is splotched red, yellow, and gray cherty silty clay or cherty clay. Cherty limestone bedrock occurs at depths of 6 to 36 feet. Small gullies are common. A few fairly large gullies occur, and it will require considerable work to fill them.

The content of organic matter and plant nutrients is low. Tilth is very poor, and internal drainage is moderate. Permeability is moderate to slow, and the capacity for holding moisture available to plants is very low. Erosion is a great hazard if the soil is cultivated.

Use suitability.—All of this soil has been cropped at some time. Much of it now is idle or is in unimproved pasture. Some areas are cropped for a few years and then allowed to lie idle for 3 or 4 years. Corn is one of the more common crops, but some cotton is also grown. Fertilization is light, and yields are low.

The unfavorable tilth, very limited capacity for holding moisture, low fertility, and rather strong slopes make this soil poorly suited to cultivated crops. If adequately fertilized and properly seeded, however, it can be made moderately productive of legume-and-grass pasture. Use and management are discussed under group 12 in the section Use and Management of Soils.

Baxter cherty silt loam, hilly phase (12 to 20 percent slopes) (BE).—This phase consists of hilly areas that are still under native forest. It is one of the least extensive of the Baxter soils. The soil is widely scattered throughout the Baxter-Cookeville-Dewey soil association, but some small areas may occur on the steeper slopes along the drains in the Dickson-Lawrence association.

The 5- to 6-inch surface layer is grayish-brown cherty silt loam. It overlies light yellowish-brown friable cherty silt loam that grades to cherty silty clay loam. Below a depth of 10 to about 36 inches the soil is yellowish-red firm cherty silty clay that in places is faintly mottled in the lower part. The soil below 36 inches is mottled or splotched yellow and gray cherty silty clay. Limestone bedrock occurs at depths ranging from 6 to about 36 feet.

This soil is moderately low in organic matter and plant nutrients. It is medium to strongly acid. The surface layer has good tilth, although the chert fragments interfere with tillage and make mowing difficult. The soil is moderately permeable to moisture and roots, has medium internal drainage, and has a moderate capacity for holding moisture available to plants. Erosion is a great hazard if the soil is cultivated.

Use suitability.—All of this soil is under native forest. Its strong slope, chertiness, and rather low content of plant nutrients make it poorly suited to cultivated crops. It can be cropped under a very long rotation, but great care is required to restrain runoff and to maintain fertility. If adequately fertilized and properly seeded, it affords a fair amount of good-quality grazing. Use and management are discussed under group 13 in the section Use and Management of Soils.

Baxter cherty silt loam, eroded hilly phase (12 to 20 percent slopes) (BF).—This soil is widely distributed throughout the Baxter-Cookeville-Dewey soil association. A few tracts may occur along the stronger slopes adjacent to the larger drains in the Dickson-Lawrence soil association.

The 4- to 5-inch plow layer is brownish-yellow to yellowish-red cherty silt loam. The subsoil is yellowish-red cherty silty clay loam to cherty silty clay that grades, at 30 inches or so, to mottled or splotched red, yellow, and gray cherty silty clay or clay. Bedrock limestone is at depths of 6 to 32 feet.

The texture of the plow layer varies according to the amount of erosion that has taken place. In a few places the surface soil is predominantly grayish-brown cherty silt loam. In contrast, many patches have lost practically all of the surface soil and some of the subsoil, and the plow layer now consists of yellowish-red cherty silty clay loam or cherty silty clay. Small gullies are common. A few gullies are so large that they will be difficult to fill by use of ordinary tillage implements.

This soil is rather low in plant nutrients and organic matter. It is medium to strongly acid. In the less eroded areas, tilth is good and internal drainage is medium; in the more severely eroded patches, tilth is very poor and internal drainage is slow. The capacity for holding moisture available to plants is moderate over most of the acreage. In the more severely eroded areas, however, it is very low; these areas are droughty and will become hard when dry. Erosion caused by runoff is a great hazard whenever the soil is tilled.

Use suitability.—All of this soil has been cleared and cropped. At the present time, however, probably not over a third is cropped regularly. In some areas corn and cotton are grown for 1 or 2 years and followed by 2 or 3 years of unimproved pasture. Light applications of fertilizer are used for cotton.

Strong slope, chertiness, and low fertility make this soil rather poorly suited to tilled crops. Where cropland is limited, the soil can be cropped if it is carefully managed. Generally, most of it should be pastured. A moderate carrying capacity can be maintained if the soil is adequately fertilized and properly seeded. Sericea lespedeza is one of the more desirable legumes. Use and management methods are discussed under group 13 in the section Use and Management of Soils.

Baxter cherty silty clay loam, severely eroded hilly phase (12 to 20 percent slopes) (BK).—Areas of this soil are small in size and total acreage. They are widely scattered over the Baxter-Cookeville-Dewey soil association.

The 4- to 5-inch plow layer is yellowish-red cherty silty clay loam or cherty silty clay. The subsoil is similar but becomes splotched or mottled at a depth of about 32 inches. Cherty limestone bedrock occurs at depths of 5 to 30 feet.

This soil is very low in content of organic matter and plant nutrients and is medium to strongly acid. Tilth is very poor. Internal drainage is slow. Compared to the surface soil of the uneroded areas, permeability of the topmost 7 or 8 inches is very slow. Roots and moisture, however, can penetrate the soil. This soil is droughty because it has a very low capacity for holding moisture available to plants. The chert is sufficiently abundant to interfere with cultivation.

Use suitability.—All of this soil has been cultivated at some time, but very little is now cropped. Corn is the chief crop and is commonly rotated with lespedeza for hay or pasture. Yields are low. The soil is poorly suited to crops because of strong slope, unfavorable moisture, and low fertility. If it is adequately fertilized, however, and properly seeded, it is moderately productive of pasture grasses and legumes. Its carrying capacity, however, is greatly limited by its low moisture supply. Use and management are discussed under group 13 in the section Use and Management of Soils.

Bodine cherty silt loam, hilly phase (12 to 20 percent slopes) (BN).—Like other Bodine soils, this is a cherty light-colored permeable soil that is moderately shallow to beds of chert. Areas are widely distributed. They occur in the more hilly parts of the uplands in the Dickson-Lawrence soil association in the northwestern part of the county. This soil is distinguished from the Baxter soils by a lack of profile development, a shallower depth to chert beds, and yellowish rather than reddish color.

Profile description:

0 to 3 inches, pale-brown to grayish-brown friable cherty silt loam; in forested areas the surface 1 inch has a higher content of organic matter that causes it to be much darker in color.
3 to 10 inches, grayish-brown, grading to yellowish-brown, friable cherty silt loam.
10 inches +, a mixture of brownish-yellow clay and chert; chert beds occur at depths of 1½ to 3 feet, and solid bedrock at depths ranging from a few feet to 10 or 12.

This soil is low in plant nutrients and organic matter. It is medium to strongly acid. Natural drainage is somewhat excessive; internal drainage is medium to very rapid. The tilth of the surface layer is favorable, but the chert is sufficiently abundant to interfere greatly with tillage. Moisture and roots penetrate the soil readily. The capacity for holding moisture available to plants is moderate to rather low, depending on the amount of chert. Erosion is active on cultivated areas. The chert content and moderately rapid permeability, however, make this soil less subject to erosion than such chert-free firm soils as the Decatur, Hermitage, and Talbott.

Use suitability.—Practically all of this soil is still under native deciduous forest. Its strong slope, chert content, and low fertility make it poorly suited to cultivated crops. Much of it can be made fairly suitable for pasture if its fertility is improved and it is properly seeded. If any of this soil must be planted to tilled crops, rotations that consist largely of close-growing small grains and legume and hay crops are necessary. Use and management are discussed under group 13 in the section Use and Management of Soils.

Bodine cherty silt loam, eroded hilly phase (12 to 20 percent slopes) (BO).—This eroded soil occupies positions on the steeper slopes bordering the larger drains or streams. It is one of the less extensive soils in the Dickson-Lawrence soil association.

The plow layer is pale-yellow cherty silt loam that grades within a few inches to a mixture of brownish-yellow clayey material and chert. Beds of chert are at depths of 1½ to 3 feet, and cherty limestone bedrock at depths ranging from a few feet to 10 or 12.

The content of organic matter and plant nutrients is low; the soil is medium to strongly acid. The surface soil has good tilth. The abundant chert, however, interferes greatly with tillage, and the larger fragments make mowing difficult. The soil is permeable to roots and moisture, and internal drainage is rapid. The capacity for holding moisture available to plants is rather low. Erosion is active where the soil is loose or cultivated. Nevertheless, this soil is much less subject to erosion than some of the soils that have no chert and that have a firmer subsoil.

Use suitability.—All of this soil has been cropped at some time. Many areas are now idle or are in unimproved pasture. A few areas are in crops, chiefly corn. Little or none of the soil is managed at a high level; yields in general are low. The strong slope, stoniness, and low fertility make the soil rather poorly suited to tilled crops. If the more desirable areas are fertilized adequately and seeded properly, they can be made moderately productive of pasture. The more cherty, drier sites should be used for forest. Methods of use and management are discussed under group 13 in the section Use and Management of Soils.

Bodine cherty silt loam, steep phase (20 to 60 percent slopes) (Bp).—This phase is much shallower than the hilly phase and in places the chert crops out at the surface. All of it occupies the narrow steep parts of the valley slopes along larger streams in the Dickson-Lawrence soil association. In some places the areas are very steep.

Generally, the topmost 3 to 4 inches is pale-brown to grayish-brown cherty silt loam over a matrix of brownish-yellow clay and chert. Chert beds occur at depths of ½ to 2 feet. Depth to solid limestone bedrock is not greater than 7 or 8 feet; in places the bedrock is near the surface.

The fertility and content of organic matter are low. The soil is medium to strongly acid throughout the profile. Internal drainage is rapid. The soil is permeable to roots and moisture. Its capacity for holding moisture available to plants is rather low.

Use suitability.—Practically all of this soil is under native deciduous forest. Its steep slope, chert content, and low fertility make it unsuitable for either crops or pasture, and it should be used for forest. Methods of use and management are discussed under group 15a in the section Use and Management of Soils.

Bruno loamy fine sand (0 to 3 percent slopes) (Br).—This very sandy soil consists of young general alluvium derived mainly from sandstone or the sandy component of other rocks that has been separated by stream deposition. The surface is nearly level to very gently billowy. Most of the areas lie in strips adjacent to the Flint River, but a few small tracts border the Tennessee and Paint Rock Rivers. Generally, this soil occupies slightly higher positions than the associated bottom-land soils that lie farther from the stream channels. All of it is subject to overflow.

Profile description:

0 to 8 inches, very pale brown to brownish-yellow loose loamy fine sand.
8 to 20 inches, pale-yellow loamy fine sand that grades to fine sand; below 20 inches the soil is a streaked or stratified brown, brownish-yellow, or pale-yellow fine sand in places; depth to bedrock (usually limestone) is more than 6 feet in nearly all areas but is 25 to 30 feet or more in some places.

This soil is very low in plant nutrients and organic matter. Usually it is medium acid. The material is very loose, and permeability is very rapid. The capacity for holding moisture available to plants is low. In most areas, however, the water table is at depths of 5 to 6 feet during much of the growing season.

Use suitability.—Much of this soil has been cleared and is pastured. A small part is under native forest that consists chiefly of willow, sycamore, poplar, and pine. Cropped areas are in fields that consist largely of more productive soils such as Lindside silty clay loam and Hamblen fine sandy loam. Corn is the chief crop. Yields vary but generally are rather low.

The very sandy texture, low moisture capacity, low fertility, and ready leaching of plant nutrients greatly limit the suitability of this soil for crops. It can be used for melons, potatoes, and other truck crops for early market but needs heavy fertilization for good yields. Among the more suitable general farm crops are corn and soybeans. Pasture productivity is low, although in places a fairly good cover of bermudagrass has been developed. Use and management methods are discussed in group 1a in the section Use and Management of Soils.

Captina and Capshaw silt loams, undulating phases (2 to 6 percent slopes) (Cc).—This is a complex of two moderately well drained soils that occupy positions on stream terraces. These soils consist of mixed materials derived from limestone, shale, and sandstone. This general alluvium is usually thin; bedrock or residuum from bedrock is at depths ranging from 4 to 15 feet.

Both soils of this complex have friable light-colored silt loam surface layers and yellowish moderately firm subsoils. The Captina soil has a brittle mottled pan at a depth of about 25 inches, whereas the Capshaw soil is mottled at that depth but is not brittle and compact. Most areas of this complex are in the Holston-Tupelo-Robertsville association in the southeastern part of the county. They are associated with the better drained Etowah and Sequatchie soils and with the more poorly drained Tupelo and Robertsville soils. In general the Captina and Capshaw soils are at a slightly higher elevation than the Tupelo soils and at a somewhat lower elevation than is usual for the Etowah and Holston soils. The Captina profile is more common than the more friable Capshaw.

Profile description (Captina silt loam):

0 to 8 inches, pale-yellow silt loam.
8 to 25 inches, light yellowish-brown to yellowish-brown friable to firm silty clay loam that breaks to nut-sized fragments; the lower part is finer textured and is firmer or more plastic.
25 to 36 inches, pale-yellow or light yellowish-brown, mottled with brown and gray, firm silty clay loam that grades to silty clay; brittle in places and breaks to well-defined fragments under pressure.
36 inches +, strongly mottled yellow, gray, brown, and reddish-brown very firm silty clay; depth to limestone bedrock widely variable but generally ranges from 4 to 15 feet.

The areas of Capshaw soil are similar to the Captina soil to a depth of about 25 inches. Below this to depths of 28 to 40 inches the soil is mottled yellow, brown, and gray moderately firm silty clay loam. Firmer more compact material may occur below a depth of 40 inches or more.

In many areas small dark-brown hard concretions commonly occur throughout much of the mapping unit, especially in the surface soils. In some areas the concretions are concentrated at a depth of about 30 inches.

This complex of soils is moderate in fertility but has a

rather low content of organic matter. It is medium to strongly acid. The plow layer has good tilth. The soil material to a depth of at least 25 inches is permeable to both roots and moisture. It has a moderately high capacity for holding moisture available to plants, and internal drainage is slow. In general, this complex has many of the favorable features of Etowah silt loam, undulating phase. Its internal drainage, however, is somewhat less favorable, and it warms more slowly in the spring.

Use suitability.—Most of this complex has been cropped at some time. The acreage in the arsenal areas south of Huntsville, however, is out of cultivation at the present time. Much of the soil elsewhere is planted to crops, principally cotton, corn, and hay. Annual lespedeza and soybeans are the chief hay crops. Moderate fertilization is used for the row crops. Yields are moderate.

The soils of this complex are well suited to a wide variety of crops, including corn, cotton, small grains, and many of the hay crops. They are not so well suited to alfalfa as are some of the better drained soils (Cumberland, Decatur, and Dewey). The lower lying areas in particular are not satisfactory for cotton.

A high productivity is easy to maintain, although natural fertility is not high. The soils are easily worked and for the most part not difficult to conserve. The more sloping areas, however, need to be protected from runoff. The soils are well suited to pasture if adequately fertilized and properly seeded. Use and management methods are discussed under group 5 in the section Use and Management of Soils.

Captina and Capshaw silt loams, level phases (0 to 2 percent slopes) (CB).—This complex occupies low, nearly level positions that have slight surface undulations or slight depressions that provide outlets for surface drainage. The slope in most places is sufficient to remove excess surface water. The surface layer and sublayers of the soils of this complex are similar to those of the undulating phases, except that mottling may be nearer the surface, in many places at 22 to 26 inches.

This is the most extensive of the Captina and Capshaw mapping units, and separate areas of the soils are fairly large. Many areas are along the Paint Rock River or its tributaries in the southeastern part of the county. Some areas occur along the southern part of the Flint River. These soils are closely associated with other Captina and Capshaw soils and with the Etowah, Sequatchie, and Holston soils.

Use suitability.—Most of this acreage has been cleared and used for crops, but at present the several large tracts within the arsenal areas south of Huntsville are not cropped. Elsewhere these soils are planted mainly to corn, hay, and grain sorghum. Cotton is grown on part of the acreage. Except for some artificially drained areas, however, the soils are generally better suited to corn than to cotton.

The nearly level surface, favorable tilth, and ability to respond to adequate fertilization make the soils suitable for most of the commonly grown crops except cotton and alfalfa. They are well suited to many of the hay crops and to pasture. Their low position and favorable moisture make them desirable for permanent pasture during the drier periods of the growing season. Use and management methods are discussed under group 5 in the section Use and Management of Soils.

Captina and Capshaw loams, undulating phases (2 to 6 percent slopes) (CA).—All of this complex occurs in the southeastern part of the county in the Holston-Tupelo-Robertsville soil association.

The 7- to 8-inch surface layer is pale-yellow loam. The subsoil to a depth of about 26 inches is light yellowish-brown to yellowish-brown friable to firm clay loam, which may be somewhat mottled in the lower part. Below 26 inches the soil is mottled yellow, gray, and brown firm clay loam that grades to stiff very firm silty clay or clay. Limestone bedrock usually occurs at depths of 4 to 15 feet.

In places the firm material is at a greater depth, and the mottled layer consists of moderately firm clay loam that lacks the brittle structure common in most of the soils below a depth of 26 inches. Some areas have a fine sandy loam texture throughout the surface layer, and in these the subsoil is sandy clay loam or sandy clay. Small tracts that have a silt loam texture occur in some areas. A small acreage has the strongly mottled material within 20 inches of the surface.

The soils of this complex have a moderate supply of plant nutrients and organic matter, and they respond well to proper fertilization. Tilth is fairly good in the plow layer, although the retarded drainage limits the periods during which the soils can be cultivated. Internal drainage is slow, but to a depth of about 25 inches the material is permeable to both roots and moisture. The capacity for holding moisture available to plants is moderately high.

Use suitability.—Practically all of this complex has been cropped at some time. Most of it is cropped at the present time, principally to corn, cotton, and hay.

The soils are productive, responsive to proper management, and fairly easy to work and conserve. Erosion is not a hazard. Artificial drainage would improve much of the acreage for general farm crops but might not be practical because of the cost and the difficulty of obtaining outlets.

These soils are suited to most of the general farm crops. Because of their restricted drainage, however, they are not favorable for alfalfa and general truck crops. If cotton is adequately fertilized, it produces consistently good yields. Lespedeza is the most common hay and pasture crop, but most of the more desirable legumes and grasses can be expected to produce well under good management. Methods of use and management are discussed under group 5 in the section Use and Management of Soils.

Colbert silt loam, undulating phase (2 to 6 percent slopes) (CK).—This soil has a light-colored silt loam surface layer and a yellowish very firm clayey subsoil that is shallow to clayey (argillaceous) limestone bedrock. It is associated with Talbott soils and is widely distributed in the Hermitage-Talbott-Colbert soil association. It occurs along coves in the southeastern part of the county and south of Huntsville.

Profile description:

0 to 3 inches, light yellowish-brown friable but rather heavy silt loam or occasionally silty clay loam; faintly mottled or streaked with yellow, brown, and gray in places; areas still under native forest have a decidedly darker color in the ½- to 1½-inch layer at the surface.

3 to 18 inches, brownish-yellow very firm silty clay faintly mottled with gray; very hard when dry, and plastic when wet.

18 to 30 inches, mottled light-gray, pale-yellow, reddish-yellow, and yellowish-red very firm silty clay; generally a very

strong blocky structure, the mass breaking easily to subangular fragments.
30 to 44 inches, mottled brownish-yellow, yellowish-brown, and gray very firm silty clay; stone bedrock at 1½ to 4 feet.

The color of the surface layer ranges from yellowish gray to yellowish brown and occasionally to the dark olive brown characteristic of the surface soil of Hollywood silty clay. In a few areas, a considerable quantity of fine sand or very fine sand is intermixed in the surface layer. A few limestone boulders or loose rock occur, but bedrock outcrops are not common.

Colbert silt loam, undulating phase, is moderately low in fertility and organic matter and is medium to strongly acid. The thin surface layer has favorable tilth, but the subsoil is slowly permeable to moisture and roots. Internal drainage is slow. This soil has a rather low capacity for holding moisture available to plants and is inclined to be droughty during excessively dry periods.

Use suitability.—Most of this soil has been cleared and cultivated. About 75 percent is now cropped or is in permanent pasture. The rest is in forest. Cotton, corn, lespedeza, and soybeans are the chief crops. The slow permeability causes runoff to develop quickly. Consequently, the shallow surface soil is easily eroded, especially on the more sloping areas. This soil is less favorable for many crops than the better drained more permeable soils because of its droughtiness and slow permeability. It is not particularly suitable for row crops, but if fertilized and otherwise well managed, it is moderately productive of many hay crops, pasture, and small grains. Use and management methods are discussed under group 7 in the section Use and Management of Soils.

Colbert silty clay loam, eroded undulating phase (2 to 6 percent slopes) (CL).—The plow layer of this eroded soil is a mixture of surface soil and subsoil. The soil is the most extensive of the Colbert soils. It is widely distributed throughout the Hermitage-Talbott-Colbert soil association.

The surface layer is brownish-yellow silty clay loam. The subsoil is brownish-yellow very firm silty clay faintly mottled with gray, the mottling increasing with depth. Below 20 to 25 inches the soil is mottled light-gray, pale-yellow, reddish-yellow, and yellowish-red very firm silty clay. Limestone bedrock is at depths of 1 to 3 feet.

In a few places all of the surface soil has been lost and the plow layer consists of brownish-yellow very firm silty clay. A very few outcrops of limestone occur, particularly on the more sloping areas.

Colbert silty clay loam, eroded undulating phase, is rather low in plant nutrients and organic matter. It is medium to strongly acid. It has slow permeability and low capacity for holding moisture available to plants. The slow rate at which moisture infiltrates causes erosion to be severe on the stronger slopes. Except in the more eroded areas, tilth of the plow layer is fair. In those areas, it is very poor because the soil material is plastic. Internal drainage is slow.

Use suitability.—Most of this soil is cropped or pastured. Cotton, corn, and lespedeza are the chief crops. Little fertilizer is used, and very little organic matter is added to the soil. Average yields are not high.

Although this soil is suitable for tilled crops, the number of crops for which it is suitable is limited by the unfavorable moisture, rather poor tilth, and susceptibility of the soil to erosion. In general it is most suitable for small grains and legumes and grasses for hay or pasture. Where feasible, moderately long to long rotations should be used. Use and management are discussed under group 7 in the section Use and Management of Soils.

Colbert silty clay loam, eroded rolling phase (6 to 12 percent slopes) (CM).—So much of the surface soil of this phase has been lost that the plow layer usually consists of a mixture of surface soil and subsoil material. This soil is widely distributed throughout the Holston-Tupelo-Robertsville and the Hermitage-Talbott-Colbert soil associations.

The 4- to 5-inch plow layer is brownish-yellow silty clay loam. This is underlain by faintly mottled brownish-yellow very firm silty clay. Below about 14 inches the soil is mottled light-gray, pale-yellow, reddish-yellow, and yellowish-red very firm silty clay or clay. Limestone bedrock is at depths of ½ to 2½ feet. In a very few places shallow or low outcrops of bedrock occur. In many patches all of the original surface soil has been removed by erosion and the plow layer consists of brownish-yellow very firm silty clay.

This soil is rather low in fertility and organic matter. It is medium to strongly acid. Tilth of the plow layer is rather poor, particularly in the more eroded areas. The soil is slowly permeable. The capacity for holding moisture available to plants is low, and the more eroded spots are droughty. Internal drainage is slow. During rains runoff water accumulates rapidly and causes erosion, especially on the more sloping areas.

Use suitability.—A large part of this soil has been cropped at some time. The few small areas that are still under native forest are not significantly eroded. Much of the soil is now in unimproved pasture, and a small acreage has reverted to forest. In the small area that is cropped, cotton, corn, lespedeza, and other general farm crops, such as soybeans and peas, predominate. Annual lespedeza, hop clover, and Dallisgrass are the principal pasture plants.

This soil can be used for tilled crops. Its slow permeability, rather unfavorable tilth, low capacity for holding moisture available to plants, and moderately strong slope, however, greatly limit it for crop production. Rotations should be used in which hay and pasture predominate, and row crops should not be grown more than once in 5 or 6 years. Sericea lespedeza is one of the more suitable legumes, and in some areas kudzu may be a practical cover, especially for stabilizing and rebuilding the soil. Use and management methods are discussed under group 10 in the section Use and Management of Soils.

Colbert silt loam, level phase (0 to 2 percent slopes) (CH).—This soil differs from the undulating phase chiefly in having a nearly level surface, a somewhat thicker surface layer, and a greater depth to bedrock. Much of it consists of material weathered from clayey limestone and reworked or moved a short distance by water. The soil occurs to a large extent in the Holston-Tupelo-Robertsville soil association.

The 4- to 5-inch surface layer is gray to pale-yellow heavy silt loam or silty clay loam. The subsoil is yellow very firm silty clay or clay, much of which is faintly mottled. Below about 20 inches, the soil is mottled light-gray, pale-yellow, reddish-yellow, and yellowish-red very firm silty clay or clay. Limestone bedrock is at depths of 2 to 4 feet.

Compared with the more sloping Colbert soils, this phase has a thicker and more friable plow layer. Its tilth is moderately good to a depth of 5 or 6 inches. The capacity for holding moisture available to plants is fairly

good. The soil has a rather low content of plant nutrients and is medium to strongly acid. Moisture penterates the 5- to 6-inch surface layer, but the heavy subsoil greatly impairs the movement of moisture and the growth of roots. The capacity for holding moisture available to plants is moderate, and internal drainage is slow. Workability and conservability are very good because of the nearly level surface and the friable surface layer.

Use suitability.—At present about 75 percent of this soil is used for crops, and most of the rest is pastured. Corn is the chief crop, but corn yields are moderate to low. Some fertilizer is applied. Cotton, grain sorghum, and soybeans are also commonly grown. Some of the better drained areas are used for fall-sown small grains. Lespedeza is one of the more common hay crops.

This soil is well suited to crops and pasture. Care is required in tilling, however, as the tilled soil puddles easily when too wet and clods when too dry. The soil is not particularly subject to erosion. If fertility is maintained at a high level, it can be cropped intensively. It is suited to a fairly wide range of crops. The yields, however, cannot be brought up to those on some of the more fertile soils, such as Cumberland loam and Etowah silt loam. Use and management methods are discussed under group 6 in the section Use and Management of Soils.

Colbert cherty silt loam, undulating phase (2 to 6 percent slopes) (CD).—This heavy yellow soil is shallow to cherty clayey limestone bedrock. It differs from the undulating phase of Colbert silt loam in containing considerably more chert; the chert content is very high below 2½ feet. This soil occupies gentle foot slopes below rocky limestone mountain areas. Most of it is in the Hermitage-Talbott-Colbert soil association. A considerable acreage is within the arsenal areas south of Huntsville.

The 6-inch surface layer is light yellowish-brown moderately friable heavy cherty silt loam or cherty silty clay loam. This is underlain by brownish-yellow very firm cherty silty clay that is faintly mottled in places with gray below about 12 inches. Below about 20 inches the soil is mottled light-gray, pale-yellow, reddish-yellow, and yellowish-red very firm cherty silty clay. Limestone bedrock is at depths of 2½ to 5 feet. There are no bedrock outcrops. Tilth of the plow layer is fairly good, but fragments of limestone and chert that occur throughout the soil interfere with tillage and mowing.

The content of plant nutrients is rather low, and the content of organic matter is moderate. The soil is medium to strongly acid. The topmost 7 to 8 inches is permeable to roots and moisture, but the subsoil is slowly permeable. The capacity for holding moisture available to plants is moderate. Internal drainage is slow.

Use suitability.—Although about 70 percent of this soil has been cleared, much of the land lies within the arsenal areas and cannot be cropped. Some areas are still in cutover native forest. The cleared farmland is in field crops or unimproved pasture. Little fertilizer is used, and yields of most crops are somewhat low. This soil is suitable for tilled crops, but the chert content and shallow depth to slowly permeable subsoil make it unsuitable for intensive use. Most areas should be planted to close-growing crops, especially to hay and pasture. If well fertilized, fall-sown small grains produce fairly good yields. Row crops cannot be grown frequently because of erosion on the more sloping areas. Use and management methods are discussed under group 7 in the section Use and Management of Soils.

Colbert cherty silty clay loam, eroded undulating phase (2 to 6 percent slopes) (CE).—This is one of the more extensive Colbert soils. The separate areas are widely distributed throughout the Hermitage-Talbott-Colbert soil association. Most of the acreage occurs in strips at the foot of stony mountain slopes.

The 3- to 4-inch plow layer now consists of a mixture of surface soil and subsoil. It is predominantly brownish-yellow cherty silty clay loam. The subsoil is brownish-yellow to yellowish-brown cherty very firm silty clay. Below about 10 inches it is faintly mottled gray, brown, yellow, and yellowish-red very firm cherty clay; limestone bedrock is at depths of 2 to 4 feet.

Many patches have lost all of the original surface soil. Their plow layer consists of brownish-yellow cherty silty clay or clay.

The content of plant nutrients and organic matter is low. Tilth ranges from fair to poor, according to the amount of original surface soil that has been lost. Except for a few inches in the surface layer, the soil is slowly permeable to moisture. The capacity for holding moisture available to plants is low. Internal drainage is slow.

Use suitability.—All of this soil has been cropped at some time. Some of it is in the arsenal areas south of Huntsville and is therefore not cultivated. Much of the rest is in crops or unimproved pasture. The chert content and shallow depth to the very firm clayey subsoil limit this soil for crop production. Most of the acreage should be planted to legume-and-grass hay or pasture, which would be rotated with fall-sown small grains. Use and management methods are discussed under group 7 in the section Use and Management of Soils.

Colbert cherty silty clay loam, eroded rolling phase (6 to 12 percent slopes or more) (CF).—A considerable amount of the original surface layer of this soil has been removed by erosion. In a few places slopes reach a maximum gradient of about 20 percent. This phase is one of the more extensive Colbert soils and is widely distributed throughout the Hermitage-Talbott-Colbert soil association. Most of it occurs in small tracts directly below the steep stony mountain slopes. Some acreage is in the arsenal areas south of Huntsville.

The 4- to 5-inch plow layer is predominantly light yellowish-brown cherty silty clay loam. The subsoil is brownish-yellow cherty very firm clay. The material below a depth of about 18 inches is mottled gray, brown, yellow, and yellowish-red very firm cherty clay. Bedrock is at depths of 1½ to 3½ feet. A large acreage has lost all of the original surface soil. In these areas the plow layer consists of yellow or brownish-yellow cherty very firm clay.

This soil is low in content of plant nutrients and organic matter and is medium to strongly acid. Tilth of the surface layer ranges from fair to poor. Chert and limestone fragments are so abundant that they interfere with tillage. The soil is slowly permeable to moisture and roots. Its capacity for holding moisture available to plants is rather low, particularly in the more eroded places. Internal drainage is slow.

Use suitability.—Practically all of this soil has been cropped at some time. The acreage within the arsenal areas is not farmed. About half of that outside the arsenal areas is regularly cropped or pastured; the rest is idle or is pastured intermittently. Cotton, corn, and lespedeza are the principal crops. In most areas little fertilizer is used, and little is done to improve the tilth and productivity. Some of this soil has reverted to forest.

This soil is greatly limited in suitability for crops by the chert fragments, rather strong slope, and shallow depth to the very firm clayey subsoil. It will produce fairly good yields of small grains and of legumes and grasses for hay and pasture. It is not well suited to row crops, mainly because of the limited moisture available to plants, unfavorable tilth, and the susceptibility of most of the soil to severe erosion. Use and management methods are discussed in group 10 in the section Use and Management of Soils.

Colbert fine sandy loam, eroded undulating phase (2 to 6 percent slopes) (Cg).—A sandier surface layer differentiates this soil from the undulating phase of Colbert silt loam. This sandy material consists of a very thin layer of general alluvium deposited over the residuum from clayey limestone. Much of this soil is in the Holston-Tupelo-Robertsville soil association in the southeastern part of the county. It is associated with Talbott fine sandy loam and with Monongahela, Tupelo, and Holston soils.

Profile description:

0 to 7 inches, gray to pale-yellow very friable fine sandy loam.
7 to 11 inches, pale-yellow friable to firm sandy clay loam to fine sandy clay.
11 to 18 inches, yellow, very firm silty clay or clay.
18 to 30 inches +, mottled gray, brown, yellow, and occasionally yellowish-red very firm silty clay or clay; limestone bedrock at depths of 2 to 3½ feet.

The thickness of the surface layer ranges from 3 to 9 inches, and the texture grades abruptly from loose fine sand to a friable fine sandy clay.

Colbert fine sandy loam, eroded undulating phase, is medium to strongly acid and low in plant nutrients and organic matter. Tilth of the plow layer is very favorable where the sandy layer is more than 4 inches thick. It is much poorer where there is a large amount of clay in the surface layer. Although the surface layer is permeable to moisture and roots, the clayey subsoil is slowly permeable, and internal drainage on the whole is slow. The capacity for holding moisture available to plants is not high, although it exceeds that for the eroded phases of Colbert silty clay loam. The more sloping areas are subject to erosion.

Use suitability.—All of this soil has been cleared and cultivated, and much of it is cropped at the present time. Cotton, corn, and hay are the most important crops, and some acreage is planted to winter small grains, sorghum, potatoes, and field peas. The soil is suitable for tilled crops. It is responsive to good management, but it needs large applications of fertilizer and benefits greatly from applications of organic matter. It is suited to practically all of the commonly grown crops. Because of its heavy subsoil, it is somewhat less desirable for truck crops and somewhat less productive than associated soils such as Holston fine sandy loam. Use and management methods are discussed in group 7 in the section Use and Management of Soils.

Cookeville silt loam, undulating phase (2 to 6 percent slopes) (Co).—This is a well-drained light reddish upland soil derived from cherty limestone. It is associated with the Dickson and Baxter soils in the Highland Rim, or gray-lands, part of the county and in parts of the Decatur-Cumberland-Abernathy soil association. It is less cherty than the Baxter soils and generally has a thicker subsoil. As a rule it is widely distributed over that part of the county north of Madison and Huntsville and east to the mountains. Most of it is on smooth or undulating landscapes.

Profile description:

0 to 7 inches, pale-brown friable silt loam.
7 to 16 inches, reddish-yellow or yellowish-red heavy but friable silt loam that grades to silty clay loam.
16 to 30 inches, yellowish-red firm silty clay loam that grades to silty clay; the mass breaks easily to blocky pieces ½ to 1½ inches in diameter.
30 inches +, yellowish-red or red firm silty clay that contains some chert; faintly to strongly mottled with yellow, brown, and gray; limestone bedrock at depths of 10 to 40 feet.

The color of the surface layer ranges from pale brown to light reddish brown. Some patches have a dark brownish-red subsoil, but they are too small to separate on the map. The 16- to 30-inch subsoil in a few places is compact or stiff cherty clay.

This soil has a moderate supply of plant nutrients, and its surface layer contains some organic matter. Tilth of the plow layer is favorable, and the soil is generally permeable to moisture and roots, at least to a depth of 16 to 20 inches. This is a well-drained soil, and its capacity for holding moisture available to plants is moderately high. Internal drainage is medium.

A few areas having a considerable amount of chert in the surface layer are included with this soil. These inclusions are actually areas of Baxter cherty silt loam that are too small to be separated on the map.

Use suitability.—Much of this soil is cropped or pastured at the present time. A wide variety of crops is grown, including cotton, corn, grain sorghum, soybeans, and field peas and other winter-legume cover crops. Fertilizer is used regularly for cotton and to some extent for other row crops. Crop yields generally are moderate.

This is one of the more desirable soils for crops and pasture. It is suited to a number of crops, including cotton, alfalfa, and market vegetables. Its smooth surface, good permeability, and favorable tilth make moderately short rotations possible, although some care is needed to control runoff. The soil responds well to proper management. Use and management methods are discussed under group 3 in the section Use and Management of Soils.

Cookeville silt loam, eroded undulating phase (2 to 6 percent slopes) (Cp).—This eroded soil occurs in large tracts on smooth or undulating landscapes. It is the most extensive of the Cookeville soils and is widely distributed throughout the northwestern part of the county, north of Madison and Huntsville.

The 5- to 6-inch plow layer is pale-brown to brown silt loam. The subsoil is predominantly yellowish-red heavy silt loam that grades to firm silty clay loam or silty clay. Below approximately 30 inches, the soil becomes variegated or mottled. Cherty limestone bedrock is at depths of 10 to 40 feet.

The content of plant nutrients and organic matter is fair to moderate; the soil is medium to strongly acid. Tilth of the surface layer is good in the less eroded areas; it is generally fair in the more eroded parts but varies according to the amount of silty clay subsoil that is mixed with the original surface layer. The soil is moderately permeable to roots and moisture and has a high capacity for holding moisture available to plants. The more sloping areas are somewhat subject to erosion.

Use suitability.—All of this soil has been cropped at some time. Much of it at present is in general farm crops and pasture. Cotton and corn are the chief crops, but

some acreage is in hay, chiefly soybeans, lespedeza, alfalfa, and sericea lespedeza. Minor crops are potatoes, grain, sorghum, melons, and tomatoes. Some of the soil is in home gardens and home orchards. Cotton receives moderately heavy applications of fertilizer, and yields are moderately high.

The smooth surface, favorable moisture supply, good tilth, and responsiveness to good management make this one of the more desirable soils of the county for crops and pasture. It is suitable for a number of crops including alfalfa, cotton, small grains, corn, and many truck crops. If the soil is carefully managed and adequately fertilized, moderately short rotations can be used. If properly seeded and fertilized, it will provide good-quality pasture. Use and management methods are discussed under group 3 in the section on Use and Management of Soils.

Cookeville silt loam, eroded rolling phase (6 to 12 percent slopes) (CR).—This eroded soil occupies the stronger slopes in association with the undulating Cookeville, Dewey, and Dickson soils. It is widely distributed throughout the northwestern part of the county, north of Madison and Huntsville.

The 5- to 6-inch plow layer now consists of a mixture of subsoil and surface soil. It ranges from pale-brown to reddish-yellow silt loam to silty clay loam. The subsoil is variegated or mottled yellowish-red firm silty clay loam that grades to silty clay. Below about 30 inches the material is red, yellow, and gray very firm silty clay. Cherty limestone bedrock is at depths of 8 to 35 feet.

Some patches, especially on the stronger slopes, have lost practically all of the original surface soil. In these areas the plow layer now consists of yellowish-red firm to very firm silty clay or silty clay loam. A few areas are severely gullied. Usually the gullies are shallow enough to fill by using ordinary tillage implements. The small acreage still under virgin forest has a pale-brown silt loam surface layer 6 to 7 inches thick. Such areas are too small to map separately as a rolling phase.

This soil has a moderate content of plant nutrients but is rather low in organic matter. It is medium to strongly acid. In most places the tilth of the surface soil is good, but on the more eroded patches it is rather poor. The soil is moderately permeable to roots and moisture. Except on the more eroded parts, it has a moderate to high capacity for holding moisture available to plants. Practically all of the acreage is subject to erosion if cultivated.

Use suitability.—Much of this soil has been cleared and is now cropped or pastured. About three-fourths of it is planted to cotton and corn. Cotton is fertilized regularly, and fairly good yields are obtained. A small part is still under native forest, and a small acreage, once cleared, has reverted to forest.

This soil is suitable for crops requiring cultivation, but because of its slope, moderately long rotations are necessary. It is suited to a number of crops, however, such as cotton, corn, small grains, and practically all of the legumes and grasses, including alfalfa. Methods of management are discussed under group 8 in the section Use and Management of Soils.

Cumberland loam, undulating phase (2 to 6 percent slopes) (CU).—This is a well-drained reddish soil on old general alluvium or stream terraces. It resembles the Decatur or Dewey soils in color, but it has a considerable amount of sand throughout the surface soil and subsoil. Most of this phase occurs in the southern part of the county, especially in the vicinity of Triana, and in some of the arsenal areas. It is associated with Dewey and Decatur soils.

Profile description:

0 to 5 inches, grayish-brown to dark-brown very friable loam.
5 to 8 inches, brown to reddish-brown loam that grades to fine sandy clay loam; crushes easily to a friable mass.
8 to 24 inches, dark reddish-brown to dark-red moderately firm very fine sandy clay loam to silty clay loam; breaks easily to blocklike fragments from ½ to 1½ inches in diameter.
24 to 48 inches, dark reddish-brown to dark-red (grading with depth to yellowish-red or light brownish-red) moderately firm silty clay; contains some very fine sand that grades to more friable material with depth; lower part of the layer may be streaked or splotched with yellow and gray; depths to limestone bedrock variable but usually 4 to 20 feet or more.

In most of this soil, fine dark concretions are common throughout the profile.

The surface layer ranges in thickness from 4 to 10 inches, and it grades in texture to fine sandy loam. In places the subsoil is more nearly sandy clay loam. Some waterworn gravel occurs in many places, and there may be a few chert fragments.

The content of plant nutrients and organic matter in Cumberland loam, undulating phase, is moderate to moderately high. The tilth of the surface layer is generally favorable. The soil is medium to strongly acid. It is moderately permeable to roots and moisture. The capacity for holding moisture available to plants is moderately high. This is one of the most productive, easily worked, and easily conserved soils in the county.

Use suitability.—Most of this soil has been cropped at some time. Much of the acreage outside the arsenal areas is used for crops, mainly cotton and corn. Good yields are obtained if adequate fertilizer is applied.

This is one of the more desirable soils for crops and pasture. It is suited to practically all the commonly grown crops, especially to cotton, corn, small grains, grain sorghum, and soybeans and all of the usual legumes and grasses for hay and pasture, including alfalfa. The soil responds well to fertilization. Except on the more rolling parts, moderately short rotations can be used. Use and management methods are discussed under group 3 in the section Use and Management of Soils.

Cumberland loam, eroded undulating phase (2 to 6 percent slopes) (CV).—Practically all of this soil occurs in the southern part of the county in the vicinity of Triana. It is associated with other Cumberland soils and with Decatur soils.

The 5- to 6-inch plow layer consists of brownish-red loam. The subsoil is dark reddish-brown to dark-red firm very fine sandy clay loam to silty clay loam similar to that of the undulating phase. The texture of the surface soil grades to clay loam, especially in eroded areas where more of the original surface soil has been lost. Fine dark concretions are common throughout the profile of most of the soil. Limestone bedrock is at depths of 4 to 15 feet.

Patches where practically all of the surface soil has been removed are common in the more exposed areas. Consequently, the plow layer in these areas is now mainly reddish firm clay loam or sandy clay loam subsoil. Waterworn gravel occurs in many places, and there may be a few chert fragments.

Cumberland loam, eroded undulating phase, is moderately high in content of plant nutrients and organic matter and is medium to strongly acid. It is moderately

permeable to roots and moisture and has a moderately high capacity for holding moisture available to plants. It is one of the most productive and most easily worked and conserved soils of the county.

Use suitability.—Most of this soil has been cropped at some time, and practically all of it outside the arsenal area is used for crops, mainly cotton and corn. Good yields are obtained if adequate fertilizer is used. Management requirements are the same as those of the undulating phase. Use and management methods are discussed under group 3 in the section Use and Management of Soils.

Cumberland loam, eroded rolling phase (6 to 12 percent slopes) (Cw).—Practically all of this soil occurs in the southern part of the county in the vicinity of Triana.

The 5- to 6-inch plow layer consists of brownish-red loam or clay loam. The subsoil is dark reddish-brown to dark-red, firm, very fine sandy clay loam or silty clay loam. Below about 20 inches the color grades to yellowish red. Streaks or splotches of yellow and gray are evident at about 25 inches. In some areas an irregular bed of gravel occurs at depths of 2½ to 7 feet. Limestone bedrock is at depths of 4 to 15 feet. Fine dark concretions are common throughout the soil, and in some areas there may be a few chert fragments.

Many patches on the steeper slopes have lost all of the original surface soil. Here, the plow layer consists of the dark reddish-brown silty clay loam subsoil in which a few small gullies may occur.

Cumberland loam, eroded rolling phase, has good drainage, although runoff is somewhat excessive. It is moderately high in content of plant nutrients and organic matter and is medium to strongly acid. Tilth is good on the less eroded areas, but the soil is cloddy where erosion is more severe. Although the soil is permeable to roots and moisture in the less eroded areas, permeability is somewhat retarded where the plow layer consists of subsoil material.

Use suitability.—Practically all of this soil has been cleared. Most of it outside the arsenal area is used for pasture or crops. Cotton and corn are the chief crops, and good yields are obtained if the soil is well managed. Adequate fertilization is especially necessary.

This soil is suited to a number of crops, including cotton, alfalfa, and small grains. The fairly good tilth, good drainage, and productivity under good management make it one of the better soils for crops. Special attention to water control is necessary, however, because of the moderately strong slope. Accordingly, moderately long rotations should be used, and tillage should be on the contour. The more eroded sloping areas should be pastured much of the time. Use and management methods are discussed under group 8 in the section Use and Management of Soils.

Decatur and Cumberland silt loams, undulating phases (2 to 6 percent slopes) (Db).—The dark-red, well-drained soils of this mapping unit have firm subsoils that are deep to bedrock limestone. The Decatur silt loam consists of residuum from high-grade limestone, and the Cumberland consists of old general alluvium derived largely from high-grade limestone. In Madison County these Decatur and Cumberland soils have physical characteristics so nearly alike and are so intermixed that it was impractical to map them separately. Cumberland loam, however, is described and mapped separately, as it contains enough sand to distinguish it from the finer textured Decatur soils.

Soils of this mapping unit are extensive. In general, they occur on broad smooth landscapes, large acreages of which are well suited to crops. They are distributed widely throughout much of the Decatur-Cumberland-Abernathy soil association. Much of the acreage is associated with the undulating and rolling Cookeville and Abernathy soils. Most areas of this complex are north of Madison and Huntsville, and ranging northeastward to the vicinity of Plevna.

Profile description of Decatur silt loam (fig. 6):

0 to 9 inches, dark-brown to dark reddish-brown friable but heavy silt loam.
9 to 13 inches, reddish-brown friable silty clay loam that loses its brownish cast and becomes redder with depth; breaks to fine subangular blocky fragments.
13 to 60 inches, dark reddish-brown to dark-red firm silty clay that grades to lighter red with depth; lower part of layer firmer in consistence; fine to medium subangular blocky structure of moderate grade.
60 inches +, red very firm silty clay splotched or streaked with light red and yellow; breaks to somewhat larger, more angular fragments than those of the layer above; limestone bedrock at depths of 5 to 20 feet.

***Figure 6.*—Profile of Decatur silt loam in a landscape of Decatur and Cumberland silt loams, undulating phases.**

That part of the complex consisting of Cumberland soil has the silty clay loam texture to a somewhat greater depth than the Decatur soil. In general the Cumberland soil, to a depth of 30 inches or more, is somewhat more friable than the Decatur. Moreover, in some areas of Cumberland silt loam, there is a considerable quantity of fine sand to depths of 2 or 3 feet, and in places there are a few pieces of quartzite gravel.

Many fine to very fine dark concretions occur throughout the profile of this complex of Decatur and Cumberland soils. They appear to have a considerable content of manganese. In many areas a considerable amount of chert occurs below a depth of 3 or 4 feet.

The supply of plant nutrients in this complex is high, and compared with the other soils of Madison County, its supply of organic matter is high. It is medium to strongly acid. The tilth of the plow layer is good. In many places, however, tillage implements do not scour so well as in the plow layer of some of the lighter colored soils such as Dickson silt loam. The soil is moderately permeable to roots and moisture, and the capacity for holding moisture available to plants is moderately high. Erosion is not a great hazard, except on the more sloping areas. Even on these areas, it is not difficult to control.

Use suitability.—Practically all of this complex is used for crops, principally cotton, corn, and hay. Cotton is by far the most extensive. Alfalfa is an important hay crop. Other common crops of less importance are small grains, potatoes, grain sorghum, soybeans, and field peas. Yields are moderately high.

These soils are among the most desirable in the county for agricultural use. They are fertile, smooth, easily worked, and not difficult to conserve. Moderate amounts of fertilizer are used, especially if row crops are to be grown. Response to proper fertilization is good, and high production is not difficult to maintain. The soils are suitable for a wide range of crops, particularly the more desirable legumes and grasses, and cotton, corn, and small grains. The more desirable legumes and pasture grasses have a high carrying capacity and provide good-quality forage.

The soils are also well suited to truck crops and nursery stock. The firm subsoil and rather fine texture, however, make them somewhat less suitable for truck crops than some of the more friable soils such as Cookeville silt loam and Etowah silt loam. Under good management moderately short rotations can be used. Use and management methods are discussed under group 3 in the section Use and Management of Soils.

Decatur and Cumberland silty clay loams, eroded undulating phases (2 to 6 percent slopes) (Df).—These eroded phases are the most extensive of the Decatur and Cumberland soils and are predominant in the Decatur-Cumberland-Abernathy soil association.

The 5- to 6-inch plow layer consists of brownish-red silty clay loam. Below this layer is reddish-brown to dark-red firm to very firm subsoil that grades with depth from silty clay loam to silty clay. High-grade limestone bedrock is at depths of 5 to 20 feet. Numerous fine to very fine dark concretions occur throughout the profile.

The soils are medium to strongly acid throughout. The supply of plant nutrients is moderately high, and organic-matter content is at least moderately so. Tilth of the plow layer ranges from fair to good according to the amount of erosion that has taken place. The more eroded soils are finer textured, so tilth is somewhat less favorable than in less eroded areas. The soils are moderately permeable. Internal drainage is medium. The soils have a moderately high capacity for holding moisture available for plant use. The more eroded areas, however, are inclined to be droughty.

Use suitability.—All of this complex of soils has been cleared, and much of it is used for crops and pasture. Cotton is the main crop, but corn and hay are of considerable importance. Other crops of importance, which are not so extensive, are fall-sown small grains, soybeans, sorghum, and field peas. In many places crimson clover is common as a winter cover crop. Row crops, especially cotton, are fertilized moderately. To get a good stand of alfalfa, it is generally necessary to apply crushed limestone and fertilizer.

Soils of this complex are among the most desirable agricultural soils in the county. They are suited to many crops, especially cotton, soybeans, grain sorghum, deep-rooted legumes such as alfalfa, and other legumes and grasses for hay and pasture. The more eroded areas are not so suitable for corn and truck crops. Such areas are limited in productivity because of poorer tilth and somewhat greater droughtiness.

These soils respond well to proper management and fertilization; high productivity is not difficult to maintain. Moderate rotations are required, however, especially on the more sloping areas. Care is needed to maintain good tilth where a considerable part of the original surface soil has been lost. Legumes and pasture grass yield well and produce grazing of high quality. Use and management methods are discussed under group 3 in the section Use and Management of Soils.

Decatur and Cumberland silty clays, severely eroded undulating phases (2 to 6 percent slopes) (Dc).—This complex consists of areas of the eroded undulating phases of Decatur and Cumberland silty clay loams that are so eroded that nearly all of the original surface soil and, in places, part of the subsoil have been lost. Areas of these soils are small. They are associated with other Decatur and Cumberland soils throughout much of the Decatur-Cumberland-Abernathy soil association area.

Both the 4- to 5-inch plow layer and the subsoil consist of dark reddish-brown to red firm to very firm silty clay, but the subsoil becomes firmer and more clayey with depth. Depth to limestone bedrock ranges from 3½ to 20 feet. A few small gullies occur on the stronger more severely eroded slopes, but they are shallow and can be eliminated by using heavy tillage implements.

The soils of this complex are moderately fertile and have a moderate to low organic-matter content. Tilth is poor in the plow layer because of the high content of clay. If cultivated, these soils puddle easily when too wet and break into hard clods when too dry. They are moderately permeable and are penetrated by roots if moisture conditions are favorable. Runoff water collects quickly and causes tilled areas to erode. Drainage is good but the capacity for holding moisture available to plants is limited, and the soils are droughty.

Use suitability.—Although all areas of this complex have been cleared and cropped, only about 15 percent is now used for crops. A small part is pastured, but much of the complex lies idle or is pastured intermittently. In recent years some areas have been terraced and returned to crops. The general level of productivity is low, and crop yields are not high. Cotton and corn are the principal crops grown. Corn does not grow well and is not very productive because of the firmness and droughtiness of the soil.

Soils of this mapping unit are suitable for crops. Their unfavorable tilth and limited moisture-holding capacity, however, greatly limit the range of crop suitability. Generally, moderately long rotations that consist predominantly of deep-rooted legumes and grasses are best suited. Management that will improve tilth and moisture-holding capacity are especially important. Where feasible, the soils should be used for permanent pasture. Use and management methods are discussed under group 12 in the section Use and Management of Soils.

Decatur and Cumberland silt loams, level phases (0 to 2 percent slopes) (DA).—This complex is fairly large. The separate areas are of moderate size and range from about 10 to 30 acres. The soils are associated with the undulating phases of Decatur and Cumberland soils. They are widely distributed throughout the Decatur-Cumberland-Abernathy soil association.

The dark-brown to dark reddish-brown silt loam surface soil ranges from 10 to 14 inches in thickness. The subsoil is dark reddish-brown to dark-red firm silty clay loam that grades to very firm silty clay below depths of 24 to 30 inches. High-grade limestone bedrock occurs at depths of 5 to more than 20 feet. As in the other Decatur and Cumberland soils, numerous fine dark concretions occur throughout the profile.

In many places the surface soil, especially where it is thickest, includes a few inches of local alluvium that has been washed from adjacent higher lying slopes of Decatur soils. In this respect soils of this mapping unit resemble the Abernathy soils, but the local alluvium of the Abernathy soils is several feet thick.

The supply of plant nutrients and organic matter is high. Soils of this mapping unit are among the most permeable or friable of the Decatur and Cumberland soils. Roots and moisture penetrate easily, and the soils have a high capacity for holding moisture available to plants. Internal drainage is medium.

Use suitability.—Practically all of this complex is cropped. Cotton, corn, and hay predominate, and yields are usually high. These are some of the most desirable soils of the county for crops and pasture because of good tilth, smooth surface, favorable moisture, and high fertility. Fertility is easily maintained, and short rotations can be used. A number of crops can be grown, including cotton, corn, small grains, truck crops and nursery stock, and all of the more desirable legumes and grasses. Use and management methods are discussed under group 3 in the section Use and Management of Soils.

Decatur and Cumberland silty clay loams, eroded rolling phases (6 to 12 percent slopes) (DG).—These eroded soils occur in association with the smoother Decatur and Cumberland soils and with Abernathy soils and are widely distributed throughout much of the Decatur-Cumberland-Abernathy soil association. In general they are part of broad smooth landscapes largely suited to cultivation.

The plow layer usually consists of from 4 to 6 inches of brownish-red silty clay loam and is a mixture of surface soil and subsoil. The subsoil is dark reddish-brown to dark-red firm to very firm silty clay loam that grades to silty clay. Depth to high-grade limestone bedrock ranges from 4 to 16 feet or more.

In the more eroded areas, which are generally on the stronger slopes, all of the original surface soil has been lost. On these areas the plow layer consists of dark reddish-brown to red firm to very firm silty clay. There are some small gullies, many of which can be obliterated by using heavy tillage implements.

Soils in this mapping unit are moderately fertile. The content of organic matter is fairly high, although it varies according to the degree of erosion. Tilth in the surface layer ranges from moderately good to fair or poor and also depends upon the degree of erosion. Soils of the more eroded areas are heavy and compact and therefore hard to cultivate. Furthermore, moisture does not penetrate easily and the capacity for storing moisture available to plants is very limited. In general, infiltration or internal drainage is slow, but the soil does not retain excess moisture to the detriment of plants.

Use suitability.—All of this land has been cropped at some time, and much of it is cultivated at present. Cotton and corn are the predominant crops, but some small grains and such crops as soybeans, grain sorghum, and field peas are grown. The land is not so well suited to corn as to cotton, because of some droughtiness.

Slope and erosion limit productivity and range of crop suitability for these soils more than for the undulating phases of Decatur and Cumberland silty clay loams. Furthermore, the soils of this complex have somewhat lower yields and are not so well suited to truck crops or other crops that need a thick friable seedbed. They are well suited to moderately long rotations that include cotton or other row crops, winter cover crops such as crimson clover, and desirable legumes and grasses for hay and pasture. Use and management methods are discussed under group 8 in the section Use and Management of Soils.

Decatur and Cumberland silty clays, severely eroded rolling phases (6 to 12 percent slopes) (DD).—Most areas of this complex occupy strips of small acreage in association with smoother areas of Decatur and Abernathy soils.

The 4- to 5-inch plow layer is dark reddish-brown to red firm to very firm silty clay. The subsoil is similar, but its clay content increases with depth. At depths below 20 inches or more, it may be splotched with yellow and some gray. High-grade limestone bedrock occurs at depths of 3 to 15 feet or more.

Where erosion has removed part of the subsoil, the plow layer is very firm clay. Some of the small gullies, which are common on more eroded, sloping areas, may be difficult to obliterate with the average heavy tillage implements.

Content of organic matter is not high in the soils of this complex. The supply of plant nutrients is rather low, although not so low as in soils such as those in the Dickson and Bodine series. The soils are medium to strongly acid. Tilth of the plow layer is poor because the high clay content makes cultivation difficult. The soils puddle easily when wet and break into hard clods if tilled when too dry. Slow penetration of moisture causes runoff to develop quickly during rains. If moisture is favorable, the soils are permeable to roots. Although internal drainage is slow, excessive moisture does not accumulate in the soils. The capacity of these soils for holding moisture available to plants is low, and the soils are therefore droughty.

Use suitability.—Although these soils were once cropped, most areas are now idle or in unimproved permanent pasture. A few areas have reverted to forest that consists chiefly of pine. Most of the few cropped areas are used for cotton.

These soils are suitable for cultivation. Their unfavorable tilth, limited capacity for holding moisture available to plants, rather strong slopes, and susceptibility to erosion if cultivated greatly limit their use, especially for row crops such as corn and cotton. If at all feasible, much of the acreage should be pastured or cropped in long rotations. Rotations should consist chiefly of close-growing crops such as fall-sown small grains, legume cover crops, and legume-and-grass hay or pasture. If fertility is increased to a high degree, the soils are well suited to alfalfa. Under usual conditions, sericea lespedeza and kudzu are practical crops. Use and management methods are discussed under group 12 in the section Use and Management of Soils.

Decatur and Cumberland silty clays, gullied phases (6 to 25 percent slopes) (DE).—This mapping unit consists of areas of the red soils of the county that have lost much of their surface soil through severe erosion. In most areas an intricate pattern of gullies has developed. This unit consists mostly of very severely eroded Cumberland, Decatur, and Dewey soils, but it also includes some acreage of Cookeville, Baxter, Colbert, Talbott, and Allen soils.

The degree and depth of gullying vary greatly. On such soils as the Talbott and Colbert, which have a very firm plastic clayey subsoil and are moderately shallow to bedrock, the gullies are not deep—in few places do they exceed 2½ feet. In the more permeable soils, such as the Baxter, Cookeville, and Cumberland, which are much deeper to bedrock, the gullies are from 5 to 8 feet in depth.

Except for some larger areas north and southwest of Triana, most areas are small, usually not more than 10 acres in size. The small areas are widely scattered over much of the county, except on mountainous areas, and occur in association with Decatur, Cumberland, Dewey, Cookeville, and Dickson soils and with some areas of Colbert and Talbott soils.

Use suitability.—These soils have been cropped at some time. Now, practically all areas are idle, in forest, or in unimproved pasture of little value. The low moisture-holding capacity, the gullies, and the extremely unfavorable tilth make these soils very poorly suited to crops or pasture.

The areas within larger areas of Dewey, Decatur, Cumberland, Cookeville, and Baxter soils that have only shallow gullies probably can be reclaimed and used for pasture or in long rotations. Heavy machinery would be needed to fill the gullies, and runoff would have to be controlled until sod is established that will protect the surface soil from erosion. The more deeply gullied areas and those that consist of very plastic clay, such as gullied Talbott and Colbert soils, probably cannot be reclaimed for any use except forest. Kudzu is a practical cover crop, as it protects the surface soil, helps to rejuvenate the soil material, and can be grazed. Use and management methods are discussed under group 12 in the section Use and Management of Soils.

Dewey cherty silty clay loam, eroded undulating phase (2 to 6 percent slopes) (DL).—Like other Dewey soils mapped in Madison County, this is a well-drained reddish or reddish-yellow soil derived from cherty moderately high-grade limestone. It is distinguished from the Baxter soils by its browner surface layer and somewhat redder subsoil, and from the Decatur soils by a lighter brown surface layer, a lighter red somewhat more friable subsoil, and a significant quantity of chert fragments throughout the profile.

Generally, areas of the eroded undulating phase of Dewey cherty silty clay loam are rather large. They occur in association with the undulating and rolling phases of Baxter, Cookeville, Decatur, and Cumberland soils. Much of the soil is in the Baxter-Cookeville-Dewey soil association, which lies principally north and northeast of Huntsville and extends to the vicinity of Plevna.

Profile description:

0 to 7 inches, brown to reddish-brown friable silt loam to silty clay loam containing sufficient chert fragments to interfere with cultivation.
7 to 12 inches, reddish-brown friable cherty silt loam to moderately friable cherty silty clay loam.
12 to 28 inches, yellowish-red to brownish-red firm cherty silty clay that breaks rather easily to subangular blocky fragments.
28 to 38 inches, faintly splotched or mottled yellowish-red, reddish-yellow, brown, and yellowish-brown firm to very firm cherty clay; high-grade cherty limestone bedrock is at depths of 8 to 20 feet or more.

On much of the acreage the plow layer consists of a mixture of surface soil and subsoil. In the less eroded, smoother areas, the surface layer is more nearly a brown cherty silt loam. Thickness of the plow layer ranges from 7 to 11 inches. There are small patches where practically all of the surface soil has been lost through erosion, and the plow layer is reddish-yellow firm to very firm silty clay. In a few places there is not enough chert to interfere with tillage.

Dewey cherty silty clay loam, eroded undulating phase, is a moderately fertile soil. It contains somewhat more plant nutrients than the Baxter and Cookeville soils but less than the Decatur and Cumberland. It has a moderate content of organic matter and is medium to strongly acid. Tilth of the plow layer is usually good, although in the more eroded places tillage is made more difficult by the high content of clay. Moisture infiltrates well, and the soil is permeable to roots. Internal drainage is medium. Except on the more eroded parts, the capacity for holding moisture available to plants is fairly high.

Use suitability.—Most of this soil is under cultivation. Cotton and corn are the chief crops. Crimson clover is commonly grown as a winter cover crop and then harvested for seed; it usually affords some grazing in winter and spring. A considerable acreage is in small grains and hay crops, and alfalfa is one of the legumes commonly grown for hay. Moderately heavy applications of fertilizer are used where cotton or alfalfa is to be grown. The ground is treated with lime when it is prepared for alfalfa.

This soil is well suited to crops, although its fertility is somewhat lower than that of the Decatur and Cumberland soils. Chert fragments are sufficiently abundant in most places to interfere materially with tillage and mowing. The smooth surface, fairly high capacity for holding moisture, good tilth, and ability to respond to good management make this soil favorable for a wide variety of crops. Among these are cotton, corn, alfalfa, small grains, soybeans, and all of the more desirable legumes and grasses for hay and pasture. The soil is suited to moderately short rotations. The more sloping parts need careful management to restrain runoff when the soil is loose or is cultivated. Use and management methods are discussed under group 3a in the section Use and Management of Soils.

Dewey cherty silty clay, severely eroded undulating phase (2 to 6 percent slopes) (DH).—This soil originally was a cherty silt loam. It is now a cherty silty clay because practically all of the original silt loam surface soil and, in places, part of the subsoil have eroded away. The separate areas are small. They are associated with undulating and rolling Cookeville and Baxter and the undulating Decatur-Cumberland complexes in the Baxter-Cookeville-Dewey soil association.

The 4- to 5-inch plow layer is yellowish-red to brownish-red firm to very firm silty clay subsoil material that contains a significant amount of chert fragments. The subsoil is yellowish-red to brownish-red very firm silty clay, mottled or splotched with gray and yellow to a depth of about 25 inches. Limestone bedrock is at depths of 7 to 18 feet or more. A few shallow gullies occur in places, but most of these can be obliterated by using heavy tillage implements.

The content of plant nutrients is moderate, but the supply of organic matter is low. The soil is medium to strongly acid. Tilth is poor and moisture infiltrates slowly. When the soil is moist, however, roots can penetrate it fairly well. The capacity for holding moisture available to plants is low, and the soil is therefore droughty.

Use suitability.—All of this soil has been cropped at some time. Only about half of it is now used for crops; most of it is idle or is in unimproved permanent pasture. Cotton is the chief crop, but some corn, small grains, and hay are grown. Moderate amounts of fertilizer are used for cotton. Productivity of the soil is not being increased greatly, except in a few areas.

This soil is suitable for cultivation, but its unfavorable tilth, low capacity for holding moisture available to plants, and susceptibility to erosion when tilled make it rather poorly suited to intensive use for row crops. Much of this soil should be in permanent pasture, but many of the small areas are so closely associated with more tillable soils that it is impractical to manage them separately. Under a high level of management, most of the acreage can be planted to small grains or to legumes and grasses for hay and pasture. Use and management methods are discussed under group 12 in the section Use and Management of Soils.

Dewey cherty silty clay loam, eroded rolling phase (6 to 12 percent slopes) (DM).—Individual areas of this soil are moderately large and are associated with other Dewey soils and with Cookeville, Baxter, and Decatur soils. Much of this soil is in the Baxter-Cookeville-Dewey soil association and occurs mainly northeast of Huntsville.

The 4- to 5-inch plow layer consists of brown to reddish-brown cherty silty clay loam. The subsoil is yellowish-red to brownish-red firm cherty silty clay loam that grades to very firm cherty silty clay splotched or variegated with yellow and gray below a depth of 24 inches. High-grade cherty limestone bedrock is at depths of 7 to 18 feet or more.

The surface layer varies considerably. For the few areas still under native forest, where little of the topsoil has been lost through erosion, the surface 9 or 10 inches is brown to dark-brown cherty silt loam. On the other hand, in a few places on the stronger slopes erosion has removed practically all of the surface layer. Here the plow layer consists of yellowish-red or brownish-red firm to very firm cherty silty clay. A few small gullies occur on the more sloping areas, but most of these can be obliterated by use of heavy tillage implements.

Dewey cherty silty clay loam, eroded rolling phase, is moderately high in plant nutrients. Except in the more eroded patches, it has a moderate amount of organic matter. The soil is medium to strongly acid. Tilth of the plow layer varies. It is favorable in the less eroded areas, and the soil works easily to a good seedbed. It is less favorable in the more eroded areas, and the soil is very difficult to work where severely eroded. Except on the more severely eroded patches, moisture usually infiltrates well, and the soil on the whole is moderately permeable to roots. Internal drainage is moderate. The soil has a moderately high capacity for storing moisture available to plants, except where erosion is advanced. The chert fragments interfere to some extent with cultivation and mowing.

Use suitability.—Most of this soil has been cropped at some time, but a small acreage is still under native forest. Probably the largest forested area is southeast of Madison. At present about 60 percent of the acreage is in crops, mainly corn, cotton, and hay. Lespedeza and soybeans are the most common hay crops.

This is a fairly desirable soil for crop production, but the rather strong slopes, erosion, and cherty fragments make it somewhat less desirable than some of the Decatur and Cookeville soils. It must have a moderately long rotation and careful management if productivity is to be maintained at a high level. Under careful management it is suitable for cotton, corn, small grains, grain sorghum, soybeans, and numerous legumes and grasses for hay and pasture. Sericea lespedeza or kudzu can be grown on the more eroded patches. Use and management methods are discussed under group 9 in the section Use and Management of Soils.

Dewey cherty silty clay, severely eroded rolling phase (6 to 12 percent slopes) (DK).—Most of this soil occurs in small tracts on the stronger slopes and is associated with the severely eroded undulating and rolling phases of other Dewey soils and with Cookeville, Baxter, and Decatur soils. Most of it is in the Baxter-Cookeville-Dewey soil association.

The 4- to 5-inch plow layer consists of yellowish-red to brownish-red very firm cherty silty clay. The subsoil is yellowish-red to brownish-red firm cherty silty clay to a depth of about 25 inches. The underlying material is very high in clay and is splotched with yellow and gray. High-grade cherty limestone bedrock is at depths of 6 to 15 feet or more. A few shallow gullies occur, but most of these can be obliterated by using heavy tillage implements.

This soil is rather low in plant nutrients and organic matter. It is difficult to work into a good seedbed because it becomes plastic when wet and hard and cloddy when dry. Moisture infiltrates slowly, but roots penetrate fairly easily if the soil is moist. Internal drainage is slow, but excess moisture does not remain in the soil. Runoff water accumulates rapidly, and erosion is therefore very active if the soil is loose or cultivated. The capacity for holding moisture available to plants is very low.

Use suitability.—Although all of this soil was once cropped, much of it is now idle or in unimproved permanent pasture. Cotton is the chief crop on the cultivated areas. Some fertilizer is used, but crop yields in general are low.

If managed properly, the soil is suitable for crops, but only to close-growing small grains and legumes for hay and pasture. Long rotations must be used to keep the soil productive. Most of the acreage is in small tracts associated with smoother more productive soils that are suitable for a wider variety of crops and to much more intensive use. Therefore, it is difficult to manage this soil so that its physical limitations are taken into account. Row crops should be excluded wherever feasible. Use and management methods are discussed under group 12 in the section Use and Management of Soils.

Dickson silt loam, undulating phase (2 to 6 percent slopes) (DT).—This is a moderately well drained soil. It has a weak to moderate siltpan in many places.[3] It is the most extensive of the Dickson soils and is predominant in the Dickson-Lawrence soil association. The parent rock is cherty limestone.

Profile description:

0 to 12 inches, light brownish-gray friable or mellow silt loam that grades to yellowish brown in the lower part; in areas under native forest the upper 2 or 3 inches is darker and contains considerable organic matter.

12 to 26 inches, yellowish-brown moderately friable light silty clay loam; moderate medium blocky structure.

26 to 44 inches, mottled yellowish-brown, yellowish-red, gray, and reddish-brown moderately firm silty clay; in some places this layer is somewhat grayer and more compact and brittle and forms the siltpan characteristic of the Dickson soils.

44 inches +, mottled gray and brownish-yellow, sometimes yellowish-red, very firm cherty clay; cherty limestone bedrock at depths ranging from 15 to 40 feet.

This soil is low in plant nutrients and organic matter and is medium to strongly acid. In areas where the siltpan occurs, moisture infiltration and root development are impeded at depths below 26 inches. Elsewhere, moisture and roots penetrate the surface soil and subsoil easily. Internal drainage therefore ranges from somewhat impaired in more open parts of the profile to slow in the siltpan parts. The capacity for holding moisture available to plants is moderately high except in areas where the siltpan occurs. In these areas, excess moisture collects above the siltpan during winter and waterlogs the soil. This impaired drainage considerably delays field work in spring and causes the soil to be cold.

Use suitability.— Much of this soil is cropped. Some of it is still in native forest (fig. 7). Cotton, corn, soybeans, and lespedeza are the chief crops. Some fertilizer is used for row crops, especially cotton. Yields range from fair to moderate.

The smooth surface, favorable tilth, and moderately adequate drainage make this soil favorable for a number of crops and for moderately intensive use. Heavy applications of fertilizer are needed to raise productivity and to keep it at a high level. Although this soil warms more slowly in the spring than some of the better drained soils, it is suited to a number of crops. These include cotton, corn, small grains, and various legumes and grasses for hay and pasture. The better drained areas are fairly suitable for alfalfa and such truck crops as tomatoes, melons, and cabbage. Use and management methods are discussed under group 5 in the section Use and Management of Soils.

Dickson silt loam, eroded undulating phase (2 to 6 percent slopes) (DU).— Much of this eroded soil is in the Dickson-Lawrence soil association in the extreme northwestern part of the county. Most of the areas are fairly large and are part of an undulating to rolling landscape that is generally suitable for cultivation.

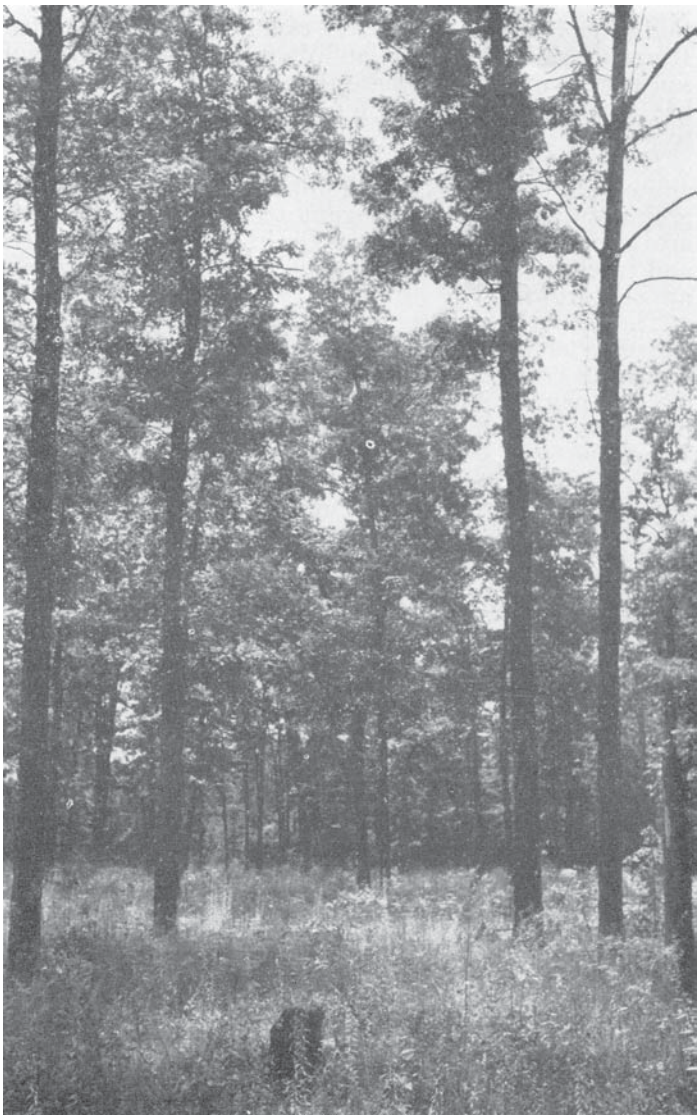

***Figure 7.*—Cutover deciduous forest, dominantly post oak and hickory, on Dickson silt loam, undulating phase.**

As a rule the plow layer is a mixture of original surface soil and subsoil material. It is usually a light yellowish-brown friable or mellow silt loam. The subsoil, to a depth of about 23 inches, is yellowish-brown friable to moderately firm silty clay loam. This is underlain by mottled firm to compact or tight silty clay loam. At a depth of about 40 inches, gray tight or compact cherty silty clay occurs. This layer is mottled with brownish yellow and some yellowish red. Cherty limestone bedrock is at depths of about 15 to 40 feet.

The amount of soil lost through erosion varies. Where there has been little erosion, the surface layer, to a depth of about 7 inches, is more nearly brownish-gray silt loam. In contrast, a few patches have lost most of the surface soil and have a plow layer of yellowish-brown friable silty clay loam.

Dickson silt loam, eroded undulating phase, is low in plant nutrients and organic matter and is medium to strongly acid. Tilth is usually fairly good, and infiltra-

[3] Dickson soils characteristically have a well-developed siltpan, but in Madison County the siltpan is not uniformly developed.

tion of moisture is moderately rapid down to the siltpan. Internal drainage is slow, and during the winter the subsoil is excessively wet where the siltpan occurs. The soil has a moderate capacity for holding moisture available to plants.

Use suitability.—Much of this soil is cultivated. Cotton and corn are the chief crops, but some acreage is in small grains and hay. Winter legumes, chiefly crimson clover, are grown to some extent. Grain sorghum, lespedeza, and truck crops, such as tomatoes, melons, and cabbage, are also grown.

The smooth surface, fairly good tilth, and moderate capacity for holding moisture make this soil suitable for numerous crops under moderately intensive management. The impaired internal drainage, however, somewhat limits its suitability. Generally, 3- or 4-year rotations should be used. This soil must be fertilized heavily in order to make it highly productive. Use and management methods are discussed under group 5 in the section Use and Management of Soils.

Dickson silt loam, level phase (0 to 2 percent slopes) (Ds).—In general the surface layer is slightly thicker and the thickness is more uniform for this phase than for the undulating phase. Usually, internal drainage is somewhat slower. Individual areas of this soil are moderately large and occur in association with other Dickson soils and with Lawrence silt loam.

The 12- to 14-inch surface layer is light brownish-gray friable soft silt loam that grades to yellowish brown. The subsoil is yellowish-brown to brownish-yellow friable to moderately firm light silty clay loam, faintly mottled with gray in places. The siltpan, although not present in all areas, is more uniformly developed than in the undulating phases. It occurs at depths of 22 to 26 inches. This layer is a mottled yellowish-brown, yellowish-red, gray, and reddish-brown firm silty clay loam that is compact and brittle in place but friable if crushed when moist. The soil below about 44 inches is gray very firm cherty clay mottled with brownish yellow and yellowish red. Cherty limestone bedrock is at depths of 15 to 40 feet.

This soil, like the undulating phase, is very low in plant nutrients and organic matter and is medium to strongly acid. The surface soil and subsoil down to the siltpan are permeable to roots and moisture. The surface layer has good tilth and works easily to a fine seedbed. The soil has a moderate capacity for holding moisture available to plants; internal drainage is rather slow. Because of this slow drainage, the soil is rather cold and warms more slowly in the spring than the better drained soils. As a result, planting is usually delayed in the spring about 2 weeks longer than on the Cookeville and Baxter soils. During the winter season, the subsoil is often waterlogged.

Use suitability.—Most of this soil is used for crops, but a small acreage is still under native forest, mainly deciduous hardwoods that are chiefly oaks. Cotton, corn, soybeans, and lespedeza for hay are the chief crops. Some grain sorghum is grown. Sorghum for sirup is a fairly common crop and yields a product of high quality. A few truck crops are grown, such as tomatoes, cabbage, melons, and potatoes.

This soil is well suited to some crops, but its impaired drainage and low fertility somewhat narrow its range of suitability. Many areas can be improved by surface ditches that are sufficiently deep to allow excess moisture to drain from the soil above the siltpan. Artificial drainage should improve the soil for cotton, corn, and fall-sown small grains and winter legumes. Undrained areas are suitable for grain sorghum, soybeans, and legumes and grasses for hay and pasture. This soil holds plant nutrients fairly well and is not subject to erosion. It therefore can be used intensively if adequately fertilized and otherwise well managed. Use and management are discussed under group 5 in the section Use and Management of Soils.

Dickson cherty silt loam, undulating phase (2 to 6 percent slopes) (Dn).—Chert fragments in the plow layer and upper subsoil of this phase interfere materially with cultivation. Most of this soil is in the northwestern quarter of the county in the Dickson-Lawrence soil association.

The 10- to 12-inch surface layer is light brownish-gray cherty silt loam that grades to yellowish brown. The subsoil, to about 26 inches, is yellowish-brown friable to moderately firm cherty silty clay loam, moderately sticky when wet. If moisture is favorable, it breaks easily to fairly well defined medium subangular blocky fragments.

From depths of about 26 to 44 inches, the soil is mottled yellowish-brown, yellowish-red, gray, and reddish-brown firm cherty silty clay loam. In places this layer is a compact and brittle siltpan that breaks easily to rather fine angular pieces if moderately moist. The underlying material is gray and brownish-yellow very firm or tight cherty clay with some yellowish-red mottles. Cherty or very cherty limestone bedrock is at depths of 15 to 40 feet.

The soil is low in plant nutrients and organic matter. It is medium to strongly acid. Except where the siltpan layer is well developed, moisture and roots penetrate easily. In siltpan areas, however, internal drainage is slow and root penetration is greatly restricted.

The capacity of this soil to hold moisture available to plants is high down to the siltpan. During the winter, in areas where the siltpan occurs, percolation of moisture is restrained, and as a result the upper layers become waterlogged. In the spring excess moisture remains longer in this soil than in the Decatur, Dewey, Cookeville, and other soils that have moderate internal drainage. Consequently, this is a cold soil, and, in general, spring field work is delayed from a week to 10 days longer than on soils of the Decatur, Dewey, and Cookeville series.

Use suitability.—Most of this soil is cropped or is in unimproved pasture. A small acreage is still under cutover native forest, chiefly oaks. Cotton and corn are the principal crops, but others commonly grown are soybeans, cowpeas, and Irish and sweet potatoes, tomatoes, melons, and sorghum for sirup. A small acreage is in winter legumes and grasses. Fertilizers are sometimes used, especially for cotton. Crop yields in general are not high.

Although this soil is suited to a number of crops, its low fertility, chert, and impaired drainage make it somewhat less suited to agriculture than many of the better drained, more fertile soils. It is well suited to small grains, sorghums, soybeans, and legumes and grasses for hay and pasture. Winter legumes can be grown on the better drained areas. The soil responds well to proper management. It can be used in moderately short rotations, but substantial amounts of fertilizer and additions of organic matter are needed to increase fertility. Use and management are discussed under group 5 in the section Use and Management of Soils.

Dickson cherty silt loam, eroded undulating phase (2 to 6 percent slopes) (Do).—Practically all of this eroded soil occurs on the broader undulating ridgetops in the Dickson-Lawrence soil association. It is associated with other

Dickson soils and with soils of the Lawrence, Baxter, and Bodine series.

On much of the acreage, the 4- to 5-inch plow layer is light brownish-gray to light yellowish-brown cherty silt loam that is a mixture of the original surface soil and subsoil. The subsoil is yellowish-brown cherty silty clay loam. The mottled firm cherty silty clay underlying material occurs at a depth of about 26 inches. Limestone bedrock is at depths of 15 to 40 feet. A few patches on the stronger slopes have lost much of the original surface soil through erosion, and here the plow layer is yellowish-brown firm cherty silty clay loam.

This soil is low in plant nutrients and organic matter. It is medium to strongly acid. As in the undulating phase, the moisture percolation and internal drainage are considerably impaired where the siltpan is well developed.

Use suitability.—Much of this soil is cultivated. Cotton and corn are the principal crops. Some fertilizer is used for row crops, especially for cotton. No great amount of organic matter is added, although a small acreage is in winter legumes and grasses. The chief legumes grown as cover crops are crimson clover and vetch.

Low fertility, impaired internal drainage, erosion, and chert limit the suitability of this soil for agriculture, but a fairly wide range of crops can be grown. The soil responds to proper management, but heavy applications of fertilizer are necessary if it is to be kept productive. Rotations can be of moderate length, but the more sloping areas must be carefully protected from erosion. The impaired internal drainage causes the soil to be cold. Accordingly, field work is delayed in the spring, and growing conditions are not so good as on the better drained, more fertile soils. This soil is fairly suitable for pasture if it is properly fertilized and seeded. It is somewhat less suitable for the more desirable legumes and grasses than the Cookeville, Cumberland, and Decatur soils. Use and management methods are discussed under group 5 in the section Use and Management of Soils.

Dickson cherty silt loam, rolling phase (6 to 12 percent slopes) (Dp).—The surface layer of this phase is, on the whole, more variable in thickness and usually shallower to the subsoil than that of the undulating phase of Dickson cherty silt loam. Practically all of this soil lies on the more sloping areas of the ridgetops in the Dickson-Lawrence soil association.

The 8- to 10-inch surface layer is light brownish-gray cherty silt loam. The subsoil is yellowish-brown friable to moderately firm cherty silty clay loam. The mottled layer is at depths of 20 to 24 inches. It overlies gray very firm or tight cherty clay having yellowish and yellowish-red mottles. Cherty limestone bedrock is at depths of 12 to 36 feet.

Most of the chert fragments are small—less than 2 or 3 inches in diameter—but some larger fragments occur in places. The amount of chert varies greatly. On much of the acreage, it is sufficient to interfere with tillage; in a few areas, there is so much that cultivation is practically impossible. As in the other cherty Dickson soils, most of the chert is porous. Some fragments, however, are very hard and angular and are especially detrimental to tillage implements.

This medium to strongly acid soil is low in plant nutrients and organic matter. Moisture infiltrates the surface soil and subsoil readily, but where the siltpan occurs, moisture is considerably retarded. In both the surface soil and subsoil layers, the capacity for holding moisture available to plants is moderately high. During the winter the siltpan in some areas causes the subsoil to waterlog.

Use suitability.—About 25 percent of this soil has been cleared and was once cropped. The rest is under cutover native forest. Very little of the soil has been improved for pasture. Common lespedeza is one of the most important pasture plants, but the stand is usually not luxuriant. Cotton, corn, and lespedeza are the principal crops. Irish potatoes, melons, tomatoes, soybeans, cowpeas, and some sorghum for sirup are grown. Yields generally are not high.

This soil is suitable for cultivation, but its low fertility, rather strong slopes, chert, and impaired internal drainage greatly limit its suitability for agriculture. It requires heavy applications of fertilizer. Moderately long rotations are needed to restrain erosion. It is suited to most of the general farm crops now grown, such as corn, cotton, sorghum for grain or sirup, small grains, soybeans, and several of the more desirable legumes and grasses. It is probably more suitable for sericea lespedeza than for some of the other legumes, particularly alfalfa. Use and management methods are discussed under group 9 in the section Use and Management of Soils.

Dickson cherty silt loam, eroded rolling phase (6 to 12 percent slopes) (Dr).—Practically all of this eroded rolling soil occurs in the extreme northwestern corner of the county. It is associated with other Dickson soils and with soils of the Lawrence, Baxter, and Bodine series. Most of it lies on the more sloping parts of the ridgetops.

The 5- to 6-inch plow layer usually consists of a mixture of the original surface soil and subsoil. It is light yellowish-brown friable or mellow cherty silt loam. The subsoil is yellowish-brown friable to moderately firm cherty silty clay loam over a mottled layer that occurs at depths of 20 to 24 inches. Cherty limestone bedrock is at 12 to 36 feet.

Many patches on the stronger slopes have lost practically all of the original surface soil. In these patches the plow layer consists of yellowish-brown cherty silty clay loam subsoil. A few small gullies occur, but most of these can be eliminated by using heavy tillage implements. The amount of chert in this soil varies greatly. Usually it is sufficient to interfere considerably with tillage, but occasionally there is enough to make cultivation nearly impossible.

This soil is low in plant nutrients and organic matter; it is medium to strongly acid. Tilth is good in the less eroded areas. Where erosion is more severe, tilth is poor because of the clayey plow layer. The larger fragments of chert are particularly detrimental to such field work as mowing and cultivating.

Use suitability.—All of this soil was once cropped. A considerable acreage is cultivated, but a part of the soil is either idle or is in unimproved pasture. A common practice is to grow cotton, 1 or 2 years of corn, and then 3 or 4 years of lespedeza for pasture. A few farmers follow the cotton crop with a winter legume, which is turned under for the corn crop the following year. Some fertilizer is used, especially if cotton is to be grown.

This soil can be used for cultivated crops. Its strong slope, eroded condition, low fertility, moderate chert content, and areas of impaired internal drainage greatly limit its usefulness for crop production. Heavy applications of fertilizer, added organic matter, and long rotations are needed to maintain moderately high yields.

Terraces may be practical for some areas. The soil is capable of supporting good pasture if fertilized and properly seeded. Use and management are discussed under group 9 in the section Use and Management of Soils.

Dowellton silt loam (0 to 3 percent slopes) (Dv).—This very plastic clayey soil was derived from clayey limestone. It resembles the Colbert and Tupelo soils in having a mottled and plastic subsoil. It is distinguished from these soils principally because the clayey material is at the surface or within a few inches of it, and because the subsoil is very plastic and not so well developed. The total area is small. All of this soil is in the Paint Rock River valley, east and northeast of New Hope.

Profile description:

0 to 5 inches, pale-gray when dry, grayish-brown when moist, friable silt loam that breaks to a crumbly mass under pressure.
5 to 12 inches, mottled light yellowish-brown, reddish-yellow, brown, and yellowish-red very firm to extremely firm clay; the mass breaks to angular fragments along fairly well developed cleavage lines.
12 to 42 inches, gray, very firm to extremely firm massive clay mottled with light brown, yellowish gray, and some reddish brown; breaks to large lumps under pressure; clayey limestone bedrock at 3 to 7 feet.

In some places the clayey subsoil is within 2 or 3 inches of the surface. A few outcrops of bedrock occur, and a few areas have chert fragments. Small dark iron concretions are common in some places. The thicker portions of the silt loam surface layer appear to be local alluvium from adjacent soils.

Dowellton silt loam is low in plant nutrients and has only a fair supply of organic matter. It is medium to strongly acid. Tilth of the plow layer is fairly good where the surface soil is at least 5 inches thick. In many places, however, where the clayey subsoil is mixed with the surface layer, tilth is less favorable. The infiltration of moisture and penetration of roots are impeded by the shallow depth to the clayey subsoil. The soil loses excess moisture slowly but has a rather low capacity for holding moisture available to plants. Like the Colbert soils, most of it is droughty during dry periods.

Use suitability.—About 70 percent of the acreage has been cleared and was cultivated at some time. The rest is under cutover native forest that consists chiefly of deciduous hardwoods. Much of the cleared acreage is now cropped or in improved pasture. Corn and hay are the chief crops. Some common lespedeza and soybeans are grown for hay. A small acreage is in cotton, grain sorghum, cowpeas, and other crops common to the area. Some soil is in pasture, part of which has been improved by seeding and using fertilizers. Row crops predominate in the rotation, and very few winter legumes are grown.

The clayey texture and slow drainage limit the usefulness of this soil for agriculture. Erosion is not active because the soil is nearly level to very gently undulating. Because the soil warms slowly in the spring, and field work is greatly delayed by excess moisture for long periods following rains, this soil is much less desirable for crops than many better drained, more permeable soils. Legumes and grasses for hay and pasture, grain sorghum, and corn are among the better suited crops.

The soil is fairly well suited to short rotations, such as 2 years of corn followed by lespedeza or soybeans for hay the third year. It is usually not suitable for winter grains. Much of the acreage can be improved by digging drainage ditches. Where ditches have been installed, the soil is much better suited to small grains and cotton. This soil is fairly good for pasture, but the grazing season is generally short because the soil is droughty. Use and management are discussed under group 6 in the section Use and Management of Soils.

Dunning silty clay (0 to 2 percent slopes) (Dw).—This dark poorly drained soil occurs on bottom lands. It consists of clayey alluvium, developed from clayey limestone. Most areas occupy slight depressions in association with other soils of the bottom lands. This soil is poorly drained and is subject to overflow.

Dunning and Hollywood soils are much alike in color, texture, and consistence, but the Hollywood are on gentle valley slopes, rather than on bottom lands, and are somewhat better drained.

The total area is not large; about 75 percent of this Dunning soil is in the Paint Rock River valley. Practically all of the acreage lies adjacent to and below soils underlain by limestone. All areas are subjected to lime-bearing water; consequently, the soil is alkaline or only slightly acid. Apparently the dark color, or moderately high content of organic matter, results from the influence of the lime-bearing water.

Profile description:

0 to 3 inches, very dark grayish-brown silty clay faintly mottled with shades of gray and yellow; sticky and plastic when wet and hard when dry; under optimum moisture conditions breaks to fine angular granules that become hard when dry.
3 to 10 inches, very dark gray plastic very firm clay that breaks to large angular blocks.
10 to 30 inches, very dark gray or dark olive-gray very firm clay mottled with dark gray, brown, and yellowish red; becomes more grayish with depth; no definite structure; breaks to large angular chunks or blocks; limestone bedrock usually at depths of more than 5 feet but in a few places is at depths of 2 or 3 feet.

This is a fertile soil. It has a moderately high content of organic matter and is slightly acid to slightly alkaline. It is very slowly permeable, and internal drainage is very slow. It is one of the first soils to be inundated by floodwaters. Tilth is poor because of the clayey texture of the surface layer.

Use suitability.—About half of this soil has been cleared, and most of the cleared land is now pastured. Lespedeza, Dallisgrass, whiteclover, Kentucky bluegrass, and orchardgrass are among the more common pasture plants. In areas that have been artificially drained, corn and soybeans are the chief crops; cowpeas, grain sorghum, and lespedeza are grown on a smaller acreage. Some Johnsongrass is grown for hay and pasture.

This soil is poorly suited to cultivated crops because of the poor drainage and unfavorable tilth of the plow layer. Artificial drainage, however, if practical, will make it more suitable for some crops. If adequately drained, the soil is suited to very intensive use, and high yields of corn, soybeans, grain sorghum, and legumes and grasses for hay and pasture can be expected. Use and management are discussed under group 14 in the section Use and Management of Soils.

Egam silty clay loam (0 to 2 percent slopes) (Eg).—This moderately well drained soil on first bottoms consists of general alluvium, much of which originated from limestone. It has a compact subsoil. It is distinguished from the Huntington soils by its slightly higher position, darker and more compact subsoil, and more droughty nature. It occupies nearly level ridgelike positions in association with the lower lying Melvin and Lindside soils.

Most areas are along the Tennessee River, although some are along the Flint and Paint Rock Rivers. Generally, the areas along the Tennessee River lie slightly below and adjacent to a strip of Bruno loamy fine sand that adjoins the river channel. On their opposite side are usually strips of Melvin and Lindside soils.

Profile description:

0 to 8 inches, dark-brown to very dark grayish-brown silty clay loam; firm in place but breaks easily to a loose mass of soft crumbs.
8 to 24 inches, very dark grayish-brown silty clay that is moderately friable under optimum moisture conditions and breaks quite easily to sharply angular fine fragments or granules less than one-fourth inch in diameter.
24 to 44 inches, dark grayish-brown to dark yellowish-brown firm to very firm silty clay, usually faintly mottled; depth to limestone bedrock widely variable but in most places it is 6 feet or more.

This soil contains a noticeable amount of mica flakes in practically all areas along the Tennessee River. Generally it is less compact or a little more friable in these areas than in those in the tributary valleys. Most of this soil in the tributary valleys is more mottled below depths of 20 to 24 inches.

This is a fertile soil; it contains a moderate amount of organic matter and is medium acid. The surface layer has fairly good tilth, but the compact subsoil greatly impedes moisture infiltration and root development. The capacity of the soil to hold moisture available to plants is moderate, but on the whole the soil is rather droughty during the drier periods of the growing season. Mainly because of the compact subsoil, internal drainage is slow. Its position on first bottoms makes the soil susceptible to flooding. Some cultivated areas scour during floods.

Use suitability.—A great part of this soil is in crops or pasture. The chief crops are corn, soybeans, and lespedeza. Cotton is grown to some extent on the better drained areas. Some acreage lies within the arsenal areas and is not used for agriculture.

Its smooth surface, high fertility, and fairly good tilth make this soil suitable for crop production, but its use is limited by its compact subsoil, which causes it to be rather droughty, and by the flood hazard. It is suitable for short rotations. Some of the crops for which it is best suited are corn, cotton, and soybeans, and some other legumes and grasses for hay and pasture. It is not suitable for crops that require a deep friable seedbed. Use and management methods are discussed under group 1 in the section Use and Management of Soils.

Ennis silt loam (0 to 2 percent slopes) (En).—This brown well-drained soil occurs on bottom lands along the larger streams, the headwaters of which are in the Dickson-Lawrence soil association. The most extensive acreage is along the Flint River. It consists chiefly of material derived from cherty limestones. Compared with Huntington silt loam, this soil is a little lighter colored, has a variable amount of chert throughout its depth, and is not quite so fertile.

Profile description:

0 to 7 inches, dark yellowish-brown very friable silt loam.
7 to 15 inches, brown to dark yellowish-brown friable silt loam, slightly firmer than the surface layer.
15 to 38 inches, lighter yellowish-brown friable silt loam that grades to silty clay loam; slightly firm in place, but crushing easily to a loose mass.

Beds of chert occur at 3½ to 10 feet. A few chert fragments sometimes occur in the surface 15 inches. They are abundant in the lower part of the 15- to 38-inch layer. In some areas these chert beds are a source of road-building material, and some gravel pits are operated. Usually the soil is somewhat mottled below a depth of about 28 inches; in a few places mottling is quite pronounced.

This is a fertile soil, although not so fertile as Huntington silt loam. It has a moderate content of organic matter and is medium acid. The surface layer has good tilth, and the entire soil is permeable to roots and moisture. The soil has a high capacity for holding moisture available to plants. Because of its position on bottom lands, it is subject to overflow. Consequently, it cannot be cultivated so early in the spring as many of the upland soils.

Use suitability.—Practically all of this soil is in crops or pasture. Corn is grown on approximately 60 percent of the acreage. Soybeans and lespedeza for hay are next in importance. Some acreage is in potatoes, sweetpotatoes, gardens, and cotton.

Except for its susceptibility to floods, this is one of the most desirable soils of the county for crops. It is easily worked and conserved, and fertility is easily maintained. It is suited to many crops and to short rotations. Crops respond well to proper fertilization. This soil holds moisture better during the drier parts of the growing season than many of the upland soils. As a result, very good to excellent pastures can be maintained. Use and management are discussed under group 1 in the section Use and Management of Soils.

Etowah silt loam, undulating phase (2 to 6 percent slopes) (Ex).—Like other Etowah soils, this is a well-drained brown soil that occurs on old stream terraces. Most of this soil was apparently derived from material weathered from high-grade limestone. As is characteristic of Etowah soils, this soil has a lighter brown surface soil and a lighter red subsoil than the Cumberland soils. It is distinguished from the Capshaw and Captina soils by a browner surface soil and a subsoil free of mottlings and pans. In general, it occurs on lower stream terraces than the Cumberland soils. The most extensive acreage is on the moderate stream terraces along Flint River and Paint Rock River. Less extensive areas occur in the valleys of the other larger creeks and rivers of the county.

Profile description:

0 to 11 inches, brown to reddish-brown mellow silt loam; the lower 5 inches grades to silty clay loam that has a weak fine blocky structure.
11 to 26 inches, yellowish-red friable but firm silty clay loam to silty clay that has a weak medium blocky structure.
26 to 50 inches, reddish-brown to brownish-red friable but rather firm silty clay that has a weak blocky structure; limestone bedrock usually at depths of 4 to 20 feet.

In a few places the subsoil is yellowish brown rather than yellowish red. Chert occurs throughout the profile of some areas along the creeks that have headwaters in the gray-lands section of the county. Some of this soil in the Paint Rock valley has a noticeable amount of sand, especially in the surface layer and upper subsoil.

Etowah silt loam, undulating phase, is high in plant nutrients and has a moderate content of organic matter. In most places it it medium acid. The surface soil has good tilth. On the whole it is quite permeable to roots and moisture. The soil has a high capacity for holding moisture available to plants. Internal drainage is medium.

Use suitability.—Practically all of this soil is used for crops. Cotton, corn, soybeans, and lespedeza are the principal crops grown, and yields generally are moderately high. Truck and garden crops are also grown. Some

fertilizer is used, especially for row crops; cotton generally receives moderate to high applications. Commonly, winter-legume cover crops are turned under for corn, and a sidedressing of nitrate of soda is applied.

This is one of the most desirable soils of the county for crops and pasture. It has good tilth and high fertility. It is not particularly subject to erosion, and it responds well to good management. It is suited to practically all crops commonly grown, including alfalfa and cotton. If properly fertilized and seeded, it will support the most desirable legumes and grasses for hay and pasture. Use and management are discussed under group 2 in the section Use and Management of Soils.

Etowah silty clay loam, eroded undulating phase (2 to 6 percent slopes) (Ey).—The plow layer of this eroded soil consists of a mixture of surface soil and subsoil. The soil occupies the medium-high terraces along the larger streams, mainly the Paint Rock, Flint, and Tennessee Rivers.

The 5- to 6-inch plow layer is brown silty clay loam. The subsoil grades to yellowish-red firm silty clay loam or silty clay that becomes finer and heavier with depth. Below 36 to 40 inches the soil may be variegated or mottled to some degree. Depth to limestone bedrock varies widely but usually is 4 to 20 feet.

A few areas along creeks that have headwaters in the gray-lands section of the county have some chert throughout the profile. An appreciable amount of sand occurs in the surface layer and upper subsoil of areas along the Paint Rock River, where part of the alluvium originated from sandstone in the Cumberland Mountains. A few small patches on the stronger slopes have lost practically all of the surface soil, and in these places the plow layer consists of yellowish-red silty clay loam.

Etowah silty clay loam, eroded undulating phase, is a fertile soil. It has a moderate amount of organic matter in the surface layer. The plow layer has good tilth, but it is not so friable as that of the uneroded phase. The soil is permeable to both roots and moisture. It has a comparatively high capacity for holding moisture available to plants. Internal drainage is medium. Erosion is active on the more sloping areas when the soil is loose or cultivated.

Use suitability.—Practically all of this soil is cultivated. Cotton, corn, lespedeza, and soybeans are the chief crops. Some acreage is in truck crops, garden crops, and pasture. Cotton receives moderately heavy applications of complete fertilizer. Much of the soil is sidedressed with nitrate of soda. Yields in general are moderately high.

This is one of the most desirable soils in the county for crops and pasture. It is productive and easily worked and conserved. It is suited to a wide variety of crops and can be used intensively for row crops. Some care is necessary to restrain runoff on the more sloping areas. Under a high level of management, which includes use of moderately short rotations and adequate fertilization, high yields of almost all the common crops can be obtained. Use and management are discussed under group 2 in the section Use and Management of Soils.

Etowah silt loam, level phase (0 to 2 percent slopes) (Ew).—Generally, this soil has a thicker surface layer, a subsoil that is not so reddish, and more mottling in the lower subsoil than the undulating phase of Etowah silt loam. It occurs on rather low stream terraces in valleys, mainly along the Flint, Paint Rock, and Tennessee Rivers. It is associated with other Etowah soils. The landscape in which it occurs is generally smooth, and much of the land is suited to cultivated crops.

The 8- to 10-inch surface layer is brown to yellowish-brown friable mellow silt loam. The subsoil is brown to dark yellowish-brown firm but friable silty clay loam. In some areas it is moderately mottled yellowish-brown, brownish-gray, and brown firm silty clay loam below about 30 inches. Limestone bedrock usually occurs at depths of 4 to 20 feet.

This soil is fertile and has a moderately high content of organic matter. It is medium acid. The surface layer has good tilth, and the soil is permeable to both roots and moisture. Internal drainage is medium. The soil has a relatively high capacity for holding moisture available to plants.

Use suitability.—Practically all of this soil, except the acreage within the arsenal areas south of Huntsville, is used for crops and pasture. Cotton, corn, and hay are the chief crops. They are moderately fertilized. A small part of the soil is pastured. This is one of the most desirable soils of the county for crops and pasture. Its high fertility, good drainage, smooth surface, and good workability make it suitable for intensive use for a number of crops. It is especially well suited to cotton, corn, and the more desirable legumes for hay and pasture. The soil responds well to adequate amounts of fertilizer and lime. Methods of use and management are discussed under group 2 in the section Use and Management of Soils.

Etowah silty clay loam, eroded rolling phase (6 to 12 percent slopes) (Ez).—The total acreage of this eroded rolling soil is small. Most of it is in small tracts on the stronger slopes and is associated with the more extensive smooth Etowah soils.

About 50 percent of the soil is moderately eroded, and in these areas, approximately half of the surface soil has been lost. The remaining 4- to 5-inch plow layer now consists of a mixture of surface soil and subsoil and is yellowish-brown silty clay loam. The subsoil is yellowish-brown to yellowish-red firm silty clay loam to silty clay. Limestone bedrock occurs at depths of 3 to 18 feet.

Severe erosion has removed practically all of the original surface soil from half the acreage of this soil. The plow layer in these areas now consists of yellowish-red firm silty clay or silty clay subsoil. There are some gullies on the stronger slopes, but most of them are small and can be obliterated by using heavy tillage implements.

The supply of plant nutrients and organic matter is much smaller in this soil than in the smoother less eroded Etowah soils. Tilth is considerably less favorable, especially on the more eroded acreage where the plow layer is heavy and difficult to till. Moisture infiltrates much more slowly than in the less eroded soils, and the capacity of the soil for holding moisture available to plants is only moderate. In most places the soil is medium o strongly acid.

Use suitability.—All of this soil was once cropped. About half of it is now abandoned or in unimproved pasture. A small acreage has reverted to forest. On the cultivated acreage, cotto ı is the chief crop, but some corn and hay are grown. Yields are much lower than on the smoother less eroded Etowah soils.

The moderately strong slope and erosion on much of the acreage limit the range of suitability for agriculture. Much of the soil, especially the steeper, more eroded parts, can be used as pasture. Under a high level of manage-

ment, the less severely eroded acreage can be rebuilt so that it will produce well under moderately long rotations.

If managed carefully, this soil is suited to a fairly wide range of crops, including cotton, corn, small grains, and many of the more desirable legumes and grasses. It is not well suited to truck crops, because of its poor tilth and the unfavorable condition of the plow layer for root crops. Use and management are discussed under group 8 in the section Use and Management of Soils.

Etowah cherty silt loam, undulating phase (0 to 6 percent slopes) (Es).—This phase differs from the undulating phase of Etowah silt loam in having chert throughout the profile. The parent material also differs from that of the undulating phase, because a considerable amount of its alluvium was derived from cherty limestone. Approximately half of this soil is nearly level. Practically all of it occupies positions along the larger streams that have headwaters in the Dickson-Lawrence soil association.

This cherty Etowah soil is distinguished from Humphreys cherty silt loam by its browner surface soil and more reddish subsoil. Furthermore, its parent material is a mixture of materials from cherty limestone and high-grade limestone, whereas the parent material of the Humphreys soils is mainly old general alluvium over cherty limestone.

Profile description:

0 to 7 inches, brown to reddish-brown cherty silt loam.
7 to 15 inches, dark reddish-brown friable cherty silt loam that becomes redder with depth.
15 to 30 inches, yellowish-red moderately firm cherty silty clay loam that grades to cherty clay with depth; the chert content generally increases with depth; the lower part of the layer has faint pale-brown and yellowish-brown mottles in many places.
30 to 50 inches, faintly mottled to strongly mottled pale-yellow, yellowish-brown, and yellowish-red moderately firm cherty clay in which gray material is an important component in the lower part of the layer; depth to limestone bedrock ranges from 4 to 20 feet.

The content of chert varies considerably. On the smoother or nearly level areas, some acreage is practically free of chert. On some patches in the more sloping areas, chert is very abundant and interferes with tillage in many places. In the smoother areas, internal drainage is a little less favorable and the mottling may be a few inches nearer the surface than indicated in the profile description. Etowah cherty silt loam, undulating phase, is moderately high in plant nutrients, and it has a fairly good supply of organic matter. It is medium acid. Although this soil is somewhat lower in fertility than Etowah silt loam, it is moderately productive and responds well to good management. The plow layer has good tilth, and the soil is permeable to both roots and moisture. It has a fairly high capacity for holding moisture available to plants, and internal drainage is medium. The more sloping areas are somewhat subject to erosion. Under good management, however, erosion is not a serious hazard.

Use suitability.—Practically all of this soil is used for general farm crops, chiefly cotton, corn, and lespedeza and other legumes and grasses for hay. It is suited to a variety of crops, including cotton, corn, grain sorghum, and alfalfa, soybeans, and other desirable legumes and grasses for hay and pasture. Moderately short rotations can be used if the soil is properly managed. Use and management are discussed under group 3a in the section Use and Management of Soils.

Etowah loam, undulating phase (2 to 6 percent slopes) (Eu).—This brown well-drained fertile soil occurs on stream terraces. The alluvial parent material came largely from limestone. Enough of it originated from sandstone, however, to make the soil considerably more sandy than the Etowah silt loam soils.

The total acreage is not large, and separate areas are of moderate size. The soil occurs in the limestone valleys along the larger creeks and streams, the headwaters of which arise in sandy soils of the mountains. A large acreage is located south of Keel Mountain and east of Gurley. Many areas are associated with areas of other smooth soils that are suitable for cultivation.

Profile description:

0 to 7 inches, grayish-brown to brown friable loam.
7 to 12 inches, light-brown to reddish-brown friable loam that grades with depth to fine sandy clay loam.
12 to 36 inches, yellowish-red to reddish-brown firm but moderately friable fine sandy clay with fairly well defined moderate blocky structure.
36 to 48 inches, faintly to strongly mottled yellow, brown, red, and gray fine sandy clay; limestone bedrock at depths of 4 to 20 feet.

Most of this soil that occurs in the Paint Rock River valley has a finer textured stiffer or firmer subsoil than is usual for this phase. In a few places, the topmost 4 to 7 inches consists of very loose fine sandy loam and overlies a more compact and firm subsoil.

This is a fertile, strongly acid soil. It has a moderate content of organic matter. The surface layer has very good tilth and is easily worked. Except in a few places where the texture is firm to very firm, the subsoil is permeable to roots and moisture. The capacity for holding moisture available to plants is high, and internal drainage is medium.

Use suitability.—Practically all of this soil is used for crops, chiefly cotton, corn, and some hay. Rotations are short and consist largely of row crops. Some fertilizer is used, especially for cotton.

This is one of the most desirable soils in the county for agriculture. It is productive, easily worked and conserved and suited to a wide variety of crops. These include cotton, corn, small grains, and alfalfa and other legumes and grasses for hay and pasture. Erosion is a hazard on some of the more sloping areas. If the soil is well managed, erosion is not difficult to control. Use and management are discussed under group 2 in the section Use and Management of Soils.

Etowah loam, eroded undulating phase (2 to 6 percent slopes) (Ev).—The plow layer of this eroded soil in most places consists of a mixture of surface soil and subsoil. Practically all of this soil is on moderately high stream terraces along the larger streams in limestone valleys. The headwaters of those streams rise in sandy soils on the mountains. Most of the acreage is associated with other Etowah soils in generally smooth landscapes well suited to crop production.

The 5- to 6-inch plow layer is grayish-brown to brown loam that grades to clay loam in places. The subsoil is predominantly yellowish-red firm sandy clay loam that grades to mottled material at about 36 inches. Limestone bedrock usually occurs at depths of 4 to 20 feet. A few places on the steeper slopes have lost practically all of the surface soil and the plow layer consists of yellowish-red fine sandy clay loam.

Etowah loam, eroded undulating phase, is a productive soil. It has a moderate supply of organic matter and is strongly acid. Tilth of the plow layer is good, although somewhat less favorable than that of the less eroded phases of Etowah loam. The soil is permeable to roots and

moisture. Except in the more eroded patches, its capacity for holding moisture available to plants is high. Internal drainage is medium.

Use suitability.—All of this soil has been cleared, and much of it is used for crops. These are chiefly cotton, corn, grain sorghum, and soybeans and some of the other desirable legumes and grasses for hay and pasture. On many farms, row crops occupy a great part of the acreage. Usually, however, some sort of rotation is followed that includes both row crops and close-growing crops, mainly lespedeza. Some fertilizer is used, especially for cotton. Crop yields generally are moderate.

This is one of the more desirable soils for agriculture. It is a fertile soil, although its productivity is somewhat lower than that of the uneroded Etowah silt loam and loam soils. It is suited to a wide variety of crops and can be used in moderately short rotations. Control of runoff is needed on the more sloping areas. Use and management are discussed under group 2 in the section Use and Management of Soils.

Etowah loam, level phase (0 to 2 percent slopes) (Et).—Nearly level relief and, in general, a lighter brown surface layer and more brownish subsoil differentiate this soil from the undulating phase of Etowah loam. Also, drainage is a little less favorable and mottling usually occurs at a somewhat shallower depth than in the undulating phase.

This soil occupies low stream terraces. It consists predominantly of material derived from limestone but contains enough sandy material to cause the soil to be considerably more sandy than the silt loam soils. The total area is not large. Most of the small individual areas occur in the southern part of the county, especially in Paint Rock River valley and near Gurley, in Flint Valley, and northeast of Triana.

The 7- to 8-inch surface layer is grayish-brown loam. The subsoil is predominantly yellowish-brown heavy loam that grades to firm fine sandy clay loam. It has a slightly reddish cast in some places. At depths below about 30 inches, the soil is faintly mottled and shortly grades to moderately mottled yellow, brown, red, and gray fine sandy clay or fine sandy clay loam. Limestone bedrock is at depths of 4 to 20 feet.

This soil is fertile and has a fairly high content of organic matter. It is medium acid. The surface layer has good tilth. The soil is permeable to roots and moisture and has a high capacity for holding moisture available to plants. Internal drainage, which is medium to slow, is somewhat slower than that of the more undulating Etowah soils. It is noticeably better, however, than the internal drainage characteristic of the Capshaw soils.

Use suitability.—Practically all of this soil has been cleared and is now used for crops. Cotton, corn, and some of the hay crops predominate. Yields are moderately high. Some fertilizer is used, especially for corn.

The moderately high fertility, high moisture capacity, good tilth, and nearly level surface make this soil well suited to intensive use. It is suitable for a wide range of crops. These include corn, cotton, sorghum, small grains, and hay and pasture plants. The somewhat retarded drainage interferes with cultivation, especially early in spring. Much of the acreage probably could be improved for general farm use by establishing a surface drainage system or tile drainage. The soil is very good for permanent pasture. Pasture vegetation continues to grow during drier periods better than on many of the more sloping soils with firmer subsoils. Use and management are discussed under group 2 in the section Use and Management of Soils.

Greendale silt loam (0 to 5 percent slopes) (Gs).—This moderately well drained to well drained light-colored soil occurs on local alluvium. It is associated with the Dickson, Baxter, Cookeville, and other soils derived from cherty limestone. Much of the acreage is in the Dickson-Lawrence and the Baxter-Cookeville-Dewey soil associations. It occupies positions in very gently sloping drainheads or strips along drainageways in the uplands that lie below the associated upland soils. It is a fairly extensive soil. Individual areas vary greatly in size. Some are not more than 1 or 2 acres, but the larger ones approach 50 acres.

Profile description:

0 to 8 inches, light yellowish-brown to pale-brown very friable silt loam.
8 to 24 inches, yellowish-brown to light yellowish-brown very friable silt loam; in places faintly mottled in the lower part; the lower few inches generally a little firmer than the surface layer.
24 to 42 inches, mottled light-gray, pale-brown, yellowish-brown, and yellowish-red moderately firm silt loam to silty clay loam; limestone bedrock occurs at depths of 7 to 25 feet.

In general the two upper layers consist of recent alluvium that has been deposited by local wash since the adjacent uplands were put under cultivation. Generally, the thickness of this alluvium ranges from 10 inches to 4 feet, depending on the accumulation of soil material from the adjoining slopes. The texture of the surface layer ranges from loam to silt loam. Some fine chert may occur throughout the profile. The color of the surface soil ranges from light yellowish-brown to brown. The subsoil is considerably browner or more reddish in all areas associated with Cookeville and cherty Dewey soils. Small dark concretions are common below a depth of about 24 inches but are not always present.

Greendale silt loam is a moderately fertile soil. Most areas have a moderate content of organic matter. Areas associated with the Dickson and Bodine soils are lighter colored, lower in organic matter, and lower in plant nutrients than the average Greendale silt loam. The tilth of this soil is good, and a fine seedbed is easily prepared. The soil, to a depth of at least 24 to 30 inches, is permeable to both roots and moisture. Internal drainage is medium down to the mottled layers. The capacity for holding moisture available to plants is high. Because of the position of this soil, it holds moisture during the drier parts of the growing season.

Use suitability.—Practically all of this soil is cropped. Much of the acreage is in row crops. Corn is predominant, but some cotton and soybeans are grown. Other common crops are lespedeza, sorghum for sirup and grain, sweetpotatoes, potatoes, and field peas. Some areas are used for gardens. The quality of sorghum grown on this soil is considered better than that of sorghum grown on soils having parent material derived from limestone. Some fertilizer is used, mostly for cotton but also for other row crops.

This soil is suited to a number of crops and to intensive use because it has a smooth surface, good tilth, and favorable moisture. It is especially favorable for crops that need moisture late in summer and early in fall. For this reason it is suitable for permanent pasture. The more nearly level tracts, which are generally not so well drained, could be improved by installing artificial drain-

age. Use and management are discussed under group 2 in the section Use and Management of Soils.

Greendale cherty silt loam (0 to 5 percent slopes) (Gr).—This soil consists of local alluvium. It is distinguished from Greendale silt loam chiefly by the chert fragments that interfere materially with cultivation. Also, it is generally somewhat stronger in slope, lighter colored, lower in organic matter, and usually closer to the source of the soil material. This soil occupies gentle slopes or drainheads and is associated with Dickson, Lawrence, Bodine, and Baxter soils. Much of it is in the Dickson-Lawrence and Baxter-Cookeville-Dewey soil associations.

Profile description:

0 to 8 inches, pale-brown to yellowish-brown cherty silt loam; very gray when dry.
8 to 16 inches, light yellowish-brown to yellowish-brown friable cherty silt loam or cherty silty clay loam.
16 to 36 inches, yellowish-brown friable but somewhat firm cherty silty clay loam; commonly somewhat mottled in lower part.
36 to 48 inches, mottled grayish-brown, yellowish-brown, and yellowish-red moderately friable but firm cherty silty clay loam; limestone bedrock at depths of 7 to 25 feet.

The amount of chert varies; in places it makes cultivation difficult. Also, the thickness of the young local alluvium varies considerably; the range is from less than 14 inches to more than 4 feet.

This soil is somewhat less fertile than Greendale silt loam. In general its content of plant nutrients and organic matter is low. The soil is friable, but there is enough chert to interfere with tillage and to some extent with mowing. The entire soil is permeable to roots and moisture, and internal drainage is medium. The capacity for holding moisture available to plants is moderate to high in areas that are not so cherty, but where chert is abundant, the soil may be droughty.

Use suitability.—Most of this soil is planted to general farm crops. Corn is the chief crop, but cotton, lespedeza, sorghum, and potatoes are of some importance. Row crops are commonly grown several years in succession on much of the acreage. Some fertilizer is used.

The smooth surface, permeability, and responsiveness to good management make this soil favorable for crop production. The soil is suited to many crops and can be farmed intensively. Except on the more cherty parts, it will support fairly good pasture if adequately fertilized and properly seeded. Use and management are discussed under group 2 in the section Use and Management of Soils.

Guthrie silt loam (0 to 2 percent slopes) (Gu).—This poorly drained gray soil was derived from local alluvium. It is characterized by a gray silty surface layer and a predominantly gray, mottled, compact subsoil. It occupies depressions in association with soils developed from limestone. The surface is nearly level, and surface drainage is poorly developed. The total area is large. Much of the soil is in the Dickson-Lawrence and the Baxter-Cookeville-Dewey soil associations. The size of the individual areas ranges from a very few acres to 40 or 50. In drainage, position, color of the surface layer, and color and consistence of the subsoil, this soil resembles Robertsville silt loam and Tyler very fine sandy loam.

Profile description:

0 to 7 inches, light-gray or nearly white, faintly mottled, friable silt loam; in uncleared areas the topmost 1 to 1½ inches is somewhat darker.
7 to 30 inches, gray compact or very firm silty clay, mottled with pale yellow, brown, and reddish brown; small dark concretions are common throughout the profile; limestone bedrock at depths of 5 to 20 feet or more.

The plow layer may be underlain by mottled gray, yellow, and brown material that contains more silt than is characteristic of the 7- to 30-inch layer. In these places the compact very firm silty clay is at depths of 12 to 15 inches.

This medium to strongly acid soil is low in plant nutrients and organic matter. The surface layer is friable and has good tilth but much of the time is too wet to cultivate. The 7- or 8-inch surface layer is permeable to moisture and roots, but the compact subsoil is very slowly permeable. Internal drainage is slow to very slow. The capacity for holding moisture available to plants is not great, and the period during which moisture is favorable for plant growth is short. In general, the soil is too wet for the usual crops during much of the growing season. During the driest part of the season it is too firm or compact for plants to grow well.

Use suitability.—Only a small part of this soil has been cleared and planted to crops, mainly corn, soybeans, lespedeza, and sorghum. At present much of the cleared acreage is pastured. Some areas have been improved.

The unfavorable moisture and poor drainage greatly limit the suitability of this soil for crops. Its best use is for pasture, but the pastures will need fertilizer and proper seeding and, for the best results, artificial drainage. Areas that have adequate artificial drainage are suited to intensive use if heavy applications of fertilizer are used. The range of crops, however, is very limited. The chief crops for which the drained areas are well suited are corn and soybeans, lespedeza, and other legumes and grasses for hay and pasture. Use and management are discussed under group 14 in the section Use and Management of Soils.

Hamblen fine sandy loam (0 to 2 percent slopes) (Ha).—This soil occurs on first bottoms along the larger creeks and rivers, the headwaters of which are in the mountainous section of the county. It consists of mixed young general alluvium derived from sandstone, limestone, and shale. It is usually associated with rather extensive areas of other soils that are well suited to cultivation. Much of the acreage is in the Flint River valley, the Paint Rock River valley, and the valleys of tributary streams. Some areas along the smaller creeks are narrow, but some along the larger streams are 20 to 50 acres in size.

Profile description:

0 to 8 inches, light grayish-brown very friable fine sandy loam.
8 to 14 inches, faintly mottled pale-brown, yellowish-brown, and yellowish-red friable fine sandy loam that grades to fine sandy clay loam with depth.
14 to 40 inches, mottled pale-yellow, brownish-yellow, light-gray, and yellowish-red fine sandy clay loam; somewhat plastic when wet; mottling sometimes intense in lower part; limestone bedrock usually at depths of 4 to 20 feet.

The texture of the surface and subsoil layers varies considerably. In general, the areas nearer to the stream channels are sandier. In these places the surface layer may be loamy fine sand and the subsoil fine sandy loam rather than fine sandy clay loam. In areas farther removed from the stream channels, the surface layer may be silt loam and the subsoil silty clay loam. In a few places, the deep subsoil is largely sand, but this is not usual.

Hamblen fine sandy loam is moderately fertile. It has a fair amount of organic matter in the surface 5 or 6 inches. Most of it is slightly acid. In some areas,

however, it is medium acid, and in others neutral or slightly alkaline. Drainage is moderately good to somewhat poor. The surface layer has good tilth and works easily to a good seedbed. After wet periods, however, the soil may not become dry enough to till as soon as some of the better drained soils. The soil is permeable to roots and moisture, but internal drainage is slow. Practically all areas are flooded at times.

Use suitability.—Much of this soil is used for crops and pasture. Approximately 60 percent is planted to row crops. Corn is the principal row crop, and soybeans and lespedeza the chief hay crops. Some sorghum is grown for sirup and grain, and a considerable acreage is in pasture, some of which has been improved. Fertilizer is generally not used. Little lime has been applied, mainly because this soil does not need it to grow legumes. Crop yields are moderately high, and pastures are of good quality.

This soil is well suited to intensive use because of the moderately high productivity, smooth surface, good tilth, and high capacity for holding moisture available to plants. Because of slow internal drainage and susceptibility to flooding, it is suited to only a few of the crops commonly grown in the county. It is well suited to corn, soybeans, and sorghum. Some of the better drained areas are suitable for cotton. If properly fertilized and seeded, it is very productive of hay and pasture plants, especially orchardgrass, fescues, red clover, whiteclover, Ladino clover, and lespedeza. Except on the sandier areas, its capacity for holding moisture available to plants during the drier periods makes it especially desirable for midsummer pasture. Use and management are discussed under group 1 in the section Use and Management of Soils.

Hartsells fine sandy loam, undulating phase (2 to 5 percent slopes) (HB).—Like other Hartsells soils, this phase of Hartsells fine sandy loam is well drained, light colored, permeable, sandy, and moderately shallow to sandstone bedrock. The Hartsells soils occupy positions on the smoother parts of the mountain ridgetops in the eastern part of the county. The largest acreage of this undulating phase is on Keel Mountain. Because of their isolated positions on the narrower mountains, some areas of this soil are not readily accessible for agricultural use.

Profile description:

0 to 11 inches, light yellowish-brown very friable fine sandy loam; the surface 1 inch or so is considerably darker in color and higher in organic matter because of partly decomposed leaf mold and rootlets.

11 to 28 inches, light yellowish-brown to yellowish-brown friable but moderately firm fine sandy loam that grades to light fine sandy clay loam faintly mottled in the lower few inches; breaks to weak-structured subangular blocky fragments.

28 to 47 inches, faintly to distinctly mottled yellowish-brown, brown, and pale-yellow friable fine sandy loam or fine sandy clay loam; much partially weathered sandstone and many sandstone fragments in lower 3 or 4 inches; sandstone bedrock at depths of 2 to 4 feet.

In areas where the soil is shallow to bedrock, the mottling in the subsoil is less obvious and the subsoil layer is thinner. In some places, at a depth of about 26 inches, a mottled, brittle, weakly cemented pan from 8 to 10 inches thick occurs.

Hartsells fine sandy loam, undulating phase, is low in plant nutrients and organic matter. It is medium to strongly acid. The surface layer has very good tilth and works easily to a fine seedbed. Permeability is moderately rapid throughout the entire profile except where the pan is developed; in such places, downward movement of water and development of roots is retarded.

Except in areas where the pan occurs or bedrock interferes, internal drainage is rapid. The capacity for holding moisture available to plants is not high, but the ease with which roots penetrate to the deep subsoil compensates for this to some extent. Moreover, light showers during dry periods are of more benefit to the crops on this sandy soil than to those on the more clayey soils, as more of the moisture penetrates the soil.

Erosion is not a great hazard, because of the smooth or gently sloping surface and the ease with which moisture penetrates. However, control of runoff is necessary on the more sloping areas, especially when the soil is under cultivation.

Use suitability.—All of this soil is under cutover forest that consists mainly of oaks. A few pines are intermixed. The smooth surface, good tilth, and ability to respond quickly to adequate fertilization, however, make this one of the more desirable soils of the county for crops. It is especially well suited to small fruits and truck crops such as potatoes, cabbage, tomatoes, beans, strawberries, and loganberries. It is also well suited to cotton, as it is a warm soil and is easily cultivated. It is moderately well suited to most of the other crops commonly grown in the county, such as small grains, sorghum, and many grasses and legumes, including soybeans. It is not so well suited to sod as some of the more fertile, finer textured soils. Use and management are discussed under group 4 in the section Use and Management of Soils.

Hartsells fine sandy loam, eroded undulating phase (2 to 5 percent slopes) (Hc).—In most places, more than half of the original surface layer of this soil has been lost. The soil occurs on the tops of mountain ridges in the eastern part of the county. Many areas are somewhat isolated because of distance from roads.

The plow layer now consists of light yellowish-brown to yellowish-brown heavy fine sandy loam. The yellowish-brown heavy fine sandy loam subsoil grades with depth to fine sandy clay loam that is faintly to distinctly mottled at about 24 inches. In a few places the subsoil has a brittle structure characteristic of a pan. Sandstone bedrock is at depths of 1½ to 3½ feet.

On the more exposed slopes, a greater part of the original surface soil is eroded away. In these areas the plow layer consists of yellowish-brown friable fine sandy clay loam in which there may be a few small gullies.

The soil is low in plant nutrients and organic matter. It is medium to strongly acid. Drainage is somewhat excessive. Tilth is good in most places but may be somewhat poor in the more eroded areas. The soil is permeable to roots and moisture. Internal drainage is medium, and the soil has a moderate capacity for holding moisture available to plants. Erosion is not difficult to control.

Use suitability.—Most of this soil is used for crops, chiefly corn. Much of it has been terraced. Crop yields vary according to the level of management, but they are especially influenced by the use of fertilizer.

Because the soil is smooth and permeable and responds well to adequate fertilization, it is suitable for a fairly wide variety of crops. It is especially well suited to many truck crops such as potatoes, tomatoes, and cabbage, and to many small fruits, such as peaches, strawberries, and loganberries. It is also fairly well suited to small grains, sorghum, and soybeans and many of the other

legumes and grasses desirable for hay and pasture. In general it is not so suitable for sod as some of the finer textured, more fertile soils. Use and management are discussed under group 4 in the section Use and Management of Soils.

Hartsells fine sandy loam, rolling phase (5 to 10 percent slopes) (HF).—This soil is similar to the undulating phase of Hartsells fine sandy loam, but it has a stronger slope and a shallower depth to bedrock. Bedrock is usually at depths of 1½ to 3 feet. This is the most extensive of the Hartsells soils. It occurs on the smooth mountaintops in the eastern part of the county, mainly on the Keel, Monte Sano, Huntsville, and Sharp Mountains. It is associated with the undulating phases of Hartsells soils and with Stony steep land, Muskingum soil material.

In general, the light yellowish-brown fine sandy loam surface layer is somewhat thinner than that of the undulating phase; the yellowish-brown fine sandy loam to fine sandy clay loam subsoil is 12 to 18 inches thick.

This soil is low in plant nutrients and organic matter. It is medium to strongly acid. Tilth is good. The soil is permeable to roots and moisture and has a moderate capacity for holding moisture available to plants. Internal drainage is moderately rapid. Erosion is a great hazard if the soil is cultivated.

Use suitability.—Practically all of this soil is under cutover deciduous forest that consists chiefly of oaks. Some pine is intermixed. It is suited to tilled crops, but because of its moderately strong slope and shallow depth to bedrock, it requires careful management. Terraces may be practical if the soil is sufficiently deep to accommodate them.

The soil responds well to adequate fertilization. It is suited to a number of crops, especially to cotton and several of the truck crops. It is also suitable for small grains, small fruits, and some of the more desirable legumes and grasses for hay and pasture. Like some of the other Hartsells soils, it is not so suitable for legume-and-grass sod for pasture as some of the more fertile, finer textured soils. Use and management are discussed under group 11 in the section Use and Management of Soils.

Hartsells fine sandy loam, eroded rolling phase (5 to 10 percent slopes) (HG).—The plow layer of this soil consists of a mixture of surface soil and subsoil. Although the total area is not large, the soil is widely distributed on the ridgetops of mountains in the eastern part of the county. Usually, it occupies positions on the more sloping parts of the mountaintops, adjacent to steep slopes of Stony steep land, Muskingum soil material. Access to much of the acreage is somewhat difficult.

The 4- to 5-inch surface layer is light yellowish-brown to yellowish-brown friable fine sandy loam. The subsoil is yellowish-brown firm fine sandy loam to fine sandy clay loam, the lower part somewhat mottled. Sandstone bedrock is at depths of 1 to 3 feet.

A few sandstone fragments occur at the surface and throughout the profile, especially in the shallower areas. Many patches in the more strongly sloping areas have lost practically all of the original surface soil. In these, the plow layer consists of yellowish-brown firm fine sandy clay loam. A few small gullies and an occasional gully more than 2 feet deep occur in such areas.

The supply of plant nutrients and organic matter is low in this medium to strongly acid soil. Drainage is somewhat excessive. Tilth is fair to very good in the surface layer, and the soil is permeable to roots and moisture. Internal drainage is rapid. The capacity for holding moisture available to plants is moderate. Erosion is severe if the soil is loose or cultivated.

Use suitability.—All of this soil has been cleared, but only about half of it is cropped. Some has reverted to forest, a small part is pastured, and a considerable acreage is idle. Much of the acreage will likely be abandoned because of its isolation. Part of the soil has been terraced, but many terraces have been allowed to deteriorate. The chief crops are corn, cotton, soybeans, field peas, potatoes, sweetpotatoes, and sorghum for sirup. Yields are low. Apparently productivity is not being maintained in many places.

Its favorable tilth and permeability and ability to respond to good management make this soil favorable for crop production. The moderately strong slope and erosion, however, limit it for intensive use. Under moderate to long rotations, the soil is suited to a fairly wide variety of crops such as corn and cotton, sorghum, and soybeans and many of the other legumes and grasses desirable for hay and pasture. Like the other Hartsells soils, it is not so well suited to sod crops as some of the more fertile silt loam soils. Use and management are discussed under group 11 in the section Use and Management of Soils.

Hartsells fine sandy loam, undulating shallow phase (2 to 5 percent slopes) (HD).—Some of this shallow soil occurs on narrow strips along the outer edges of the mountain ridgetops. It lies adjacent to Stony steep land, Muskingum soil material Part occurs on benches on the mountain slopes, and in these areas the material was derived from thin beds of hard-textured sandstone. Practically all of the areas on the benches are so isolated that they are not suitable for agriculture.

The 7- to 10-inch surface layer is light yellowish-brown fine sandy loam. The subsoil, to a depth of about 20 inches, is yellowish-brown friable fine sandy clay loam. Below this is variegated or weakly mottled yellowish-brown, pale-yellow, and brown friable fine sandy clay loam. Sandstone bedrock occurs at depths of 1 to 2½ feet. Sandstone fragments occur in this soil in some places especially in the shallower areas, and there is an occasional sandstone outcrop.

Drainage is somewhat excessive. The soil is low in plant nutrients and organic matter. It is medium to strongly acid. The plow layer has good tilth, and the soil is permeable to roots and moisture. Capacity for holding moisture available to plants is rather low, mainly because of the sandy texture of the soil and the shallow depth to bedrock. In general, the soil is rather droughty.

Use suitability.—Practically all of this soil is under cutover deciduous forest consisting chiefly of oaks. Some pine is intermixed. Although the soil is suitable for tilled crops, its shallow depth to bedrock greatly limits its productivity and range of usefulness. Erosion must be carefully restrained, as any loss of soil material would greatly affect productivity. Principally because of the shallowness of the soil, a high level of productivity cannot be maintained easily. Use and management are discussed under group 4 in the section Use and Management of Soils.

Hartsells fine sandy loam, eroded undulating shallow phase (2 to 5 percent slopes) (HE).—Much of this eroded soil occurs as narrow strips below and adjacent to undulating and rolling Hartsells soils that are deeper to bed-

rock. A few areas are on the benches of steep mountain slopes.

The 4-to 5-inch plow layer is light yellowish-brown fine sandy loam that grades to heavy fine sandy loam. The subsoil is predominantly yellowish-brown friable fine sandy loam to fine sandy clay loam. The soil below about 20 inches is weakly to moderately variegated or mottled yellowish brown, pale yellow, and brown. Depth to sandstone bedrock ranges from 1 to 2½ feet. Some sandstone fragments are on the surface, and rock outcrops occur in places. There are a few small gullies on the more eroded patches.

The supply of plant nutrients and organic matter is low in this medium to strongly acid soil. Tilth is usually good in the surface soil, except in the more eroded areas, where it is somewhat poor. The soil is permeable to roots and moisture. Surface drainage is excessive and internal drainage somewhat excessive. The capacity for holding moisture available to plants is moderate, but much of the soil is considerably more droughty than the deeper Hartsells soils.

Use suitability.—All of this soil has been cleared at some time, but only about 60 percent of it is cropped. Part of the rest is in unimproved permanent pasture, and part is idle. Corn is the chief crop. Usually the level of management is not high, and yields in general are low.

The soil is suitable for many of the crops common to the area, but its strong slope and shallow depth to bedrock greatly limit its usefulness. In general, moderately long rotations should be used, and care should be taken to restrain erosion.

The soil is suited to a fairly wide variety of crops, including cotton, corn, and many of the commonly grown truck crops and small fruits. It is also fairly suitable for small grains and many of the more desirable legumes and grasses for hay and pasture. It is responsive to proper management. Its shallow depth to bedrock, however, and consequent lowered capacity for holding moisture available to plants limit the level to which its productivity can be raised. Use and management are discussed under group 4 in the section Use and Management of Soils.

Hartsells fine sandy loam, rolling shallow phase (5 to 10 percent slopes) (HH).—All of this shallow soil occurs on top of mountain ridges in the eastern part of the county and is usually associated with other Hartsells soils. Some of the narrow mountaintops are occupied entirely by this soil.

The 7- to 8-inch surface layer is light yellowish-brown fine sandy loam. The upper 1 or 2 inches of the surface layer contains a considerable amount of partly decayed leaves and roots and is therefore darker in coloring and fairly high in organic matter. The subsoil to a depth of about 18 inches is yellowish-brown friable fine sandy loam or fine sandy clay loam. Below this is weakly to moderately mottled yellowish-brown, pale-yellow, and brown fine sandy clay loam or fine sandy loam underlain by sandstone bedrock. Some sandstone fragments occur in the soil, and bedrock sandstone outcrops in places.

This soil is low in plant nutrients and organic matter. It is medium to strongly acid. Drainage is somewhat excessive, and the soil is permeable to roots and moisture. Although moisture infiltrates well, the capacity for holding moisture available to plants is limited by the shallow depth to bedrock. Because of the sandy surface layer, however, plants make good use of moisture from light showers that fall during the drier parts of the growing season.

Use suitability.—All of this soil is under cutover deciduous forest. Its suitability for cultivated crops is fairly good but is restricted by its rather strong slope, low fertility, and shallow depth to bedrock. Since the soil is easily eroded when cultivated, many of the more sloping areas should be put in permanent pasture.

If carefully managed, the soil is suited to a wide variety of crops, including corn, cotton, soybeans, sorghum, and many truck crops and small fruits. It is also suited to small grains, hay, and pasture but is not so suitable for these as many of the more fertile silt loam soils. Although its productivity is restricted by its somewhat low capacity for holding moisture available to plants, the soil responds well to proper management, especially to adequate fertilization. Methods of use and management are discussed under group 11 in the section Use and Management of Soils.

Hartsells fine sandy loam, eroded rolling shallow phase (5 to 10 percent slopes) (HI).—The total area of this soil is not large; most of the individual areas are small, and many are isolated. Much of the acreage lies directly adjacent to, and above, the mountain slopes occupied by Stony steep land, Muskingum soil material. This soil is generally associated with other phases of Hartsells soils.

The 4- to 5-inch plow layer consists of light yellowish-brown to yellowish-brown firm fine sandy loam. The subsoil is yellowish-brown friable fine sandy clay loam. Sandstone bedrock occurs at depths of ½ to 2 feet.

On many patches, practically all of the original surface soil has been eroded away, and the plow layer now consists of yellowish-brown firm fine sandy loam or fine sandy clay loam. A few shallow gullies occur on the more eroded patches. In most areas sandstone fragments are common, and in places the sandstone bedrock outcrops.

Hartsells fine sandy loam, eroded rolling shallow phase, is low in plant nutrients and organic matter. It is medium to strongly acid. The plow layer has fairly good tilth, and the soil is permeable to moisture and roots throughout the profile. Internal drainage is rapid, and drainage is generally somewhat excessive. Runoff develops quickly; erosion damages the soil easily because of the shallow depth to bedrock. The soil in general is droughty. The shallow depth to bedrock, however, causes seepage water to come to the surface in many places during prolonged wet periods.

Use suitability.—All of the soil has been cropped at some time. Before the use of commercial fertilizers became common, farmers on these mountaintops usually used the more sloping areas of the Hartsells soils because they appeared to be somewhat more fertile than the smoother areas. After commercial fertilizers came into use, the smoother areas were brought into production and the more sloping shallow areas were abandoned. Consequently, much of the eroded rolling shallow phase is now idle. The part that is cropped is chiefly in corn and pasture. Some of the idle acreage has reverted to forest, chiefly pine. Very little has been improved for pasture, and crop yields in general are low.

This soil is suitable for crops, but the strong slope and shallow depth to bedrock make runoff a great hazard. Much of the acreage should be cropped in moderately long rotations or should be put in permanent pasture. Under careful management, the soil is suited to a fairly wide variety of crops, including corn, cotton, soybeans, sorghum for sirup and grain, and some of the common truck crops and small fruits. It is also fairly suitable for small grains and many of the more desirable legumes and grasses for

hay and pasture. It responds well to proper fertilization. Its limited capacity for holding moisture and its droughtiness during prolonged dry periods greatly limit its productivity. Methods of use and management are discussed under group 11 in the section Use and Management of Soils.

Hermitage silt loam, undulating phase (2 to 6 percent slopes) (Ho).—Like other Hermitage soils, this is a well-drained red soil that consists of old colluvium or local alluvium, derived largely from high-grade limestone. It occurs on gentle slopes at the foot of steep mountain slopes. In general, it is a part of undulating and rolling landscapes that are largely suitable for cultivated crops. Areas of this soil are usually small and are widely scattered throughout the eastern, northeastern, and central parts of the county.

Profile description:

0 to 6 inches, grayish-brown to brown friable silt loam.
6 to 15 inches, yellowish-red friable to moderately firm silty clay loam that grades with depth to silty clay; breaks easily to medium-sized subangular fragments.
15 to 28 inches, yellowish-red firm silty clay that has a moderate medium blocky structure; the color weakly variegated with shades of yellow, especially in the lower part of the layer.
28 to 52 inches, yellowish-red very firm silty clay mottled with yellowish brown, yellowish gray, and brown; limestone bedrock occurs at depths of about 4 to 10 feet.

The thickness of the colluvium or local alluvium is variable, but the lower part of the profile is predominantly residuum from limestone. A small amount of chert occurs throughout the profile in some areas. In many places the underlying material below a depth of 2 or 3 feet is very cherty.

The supply of plant nutrients is moderately high; a moderate amount of organic matter is in the surface 6 or 8 inches. The soil is medium to strongly acid. The plow layer has fairly good tilth and is not difficult to work to a fine seedbed. The 7- to 10-inch surface layer is permeable to moisture, but the permeability becomes increasingly slower with depth, especially below about 2 feet. Internal drainage is moderately slow, but drainage is generally suitable for crops. The capacity for holding moisture available to plants is moderately high. Except where runoff from the adjacent steep mountain slopes flows onto areas of this soil, erosion is not difficult to control.

Use suitability.—Practically all of this soil has been cleared, and a great part is now used for crops, mainly corn, cotton, soybeans, and lespedeza. Rotations are rather short. Some fertilizer is used, and fairly good yields are obtained.

This is one of the more desirable soils for agricultural use; it is productive, easily worked, and not difficult to conserve. It responds well to good management. It is suited to a wide variety of crops, including cotton, corn, soybeans, small grains, and legumes and grasses for hay and pasture. It is also suited to truck crops and fruits. Other soils, however, such as the undulating phase of Hartsells fine sandy loam, are better suited to truck crops and fruits because they are more friable and permeable.

The undulating phase of Hermitage silt loam responds well to proper fertilization and produces high yields under good management. It is especially desirable for legumes and grasses if adequate lime has been applied and fertility has been brought to a high level. Use and management are discussed under group 3 in the section Use and Management of Soils.

Hermitage silt loam, eroded undulating phase (2 to 6 percent slopes) (Hp).—This eroded soil is associated with other Hermitage soils at the base of steep mountain slopes in the limestone valleys.

The 4- to 6-inch plow layer now consists of brown to reddish-brown silt loam that in places grades to silty clay loam. The subsoil is yellowish-red firm silty clay loam that grades with depth to variegated yellowish-red, yellowish-brown, yellowish-gray, and brown very firm silty clay. Limestone bedrock occurs at depths of 4 to 10 feet.

Many areas have a moderate amount of chert throughout the surface layer and subsoil, and in many places the deep subsoil is very cherty silty clay. Practically all of the surface soil has been lost in a few areas, and the plow layer consists of yellowish-red firm silty clay loam.

Hermitage silt loam, eroded undulating phase, is moderately fertile. It ranges from medium to strongly acid. The supply of organic matter varies according to the amount of erosion that has taken place. Much of the soil in this phase is subject to erosion, especially those areas that receive runoff water directly from the adjacent steep slopes of stony land above them. Tilth depends upon the texture of the soil in the plow layer but ranges from good to fair. The upper part of the soil is permeable to moisture and roots, but the deeper, more silty clay layers are more slowly permeable. Internal drainage is medium. Capacity for holding moisture available to plants is moderately high.

Use suitability.—Much of this soil is used for crops. A small part is pastured, and a small acreage is idle. The principal crops are cotton and corn. Rather short rotations are used, and the row crops are commonly fertilized.

This is one of the better soils for crops, as it is productive, easily worked, and not difficult to conserve. It is suited to a wide variety of crops, including cotton, corn, small grains, and soybeans and other legumes and grasses desirable for hay and pasture. Moderately short rotations are suitable if runoff is controlled and fertility is maintained at a high level. Use and management are discussed under group 3 in the section Use and Management of Soils.

Hermitage silt loam, eroded rolling phase (6 to 12 percent slopes) (Hq).—This soil is a little more cherty than the undulating phase of Hermitage silt loam, although usually the chert does not interfere greatly with cultivation.

Like the other Hermitage soils, most of this phase occupies gentle valley slopes directly below the steep stony mountain slopes. Practically all of it is in the eastern and south-central parts of the county. The less cherty areas usually are associated with the Decatur, Dewey, and Cumberland soils, whereas areas with a greater quantity of chert are more closely associated with the Baxter soils.

The 4- to 6-inch surface layer is brown to reddish-brown silt loam or silty clay loam. It usually consists of a mixture of the original surface soil and subsoil. The subsoil to a depth of about 20 inches grades from yellowish-red silty clay loam to yellowish-red firm silty clay. The underlying soil is variegated or mottled yellowish-red, yellowish-brown, pale-yellow, and brown very firm silty clay. Limestone bedrock occurs at depths of 3 to 8 feet.

A considerable amount of this soil is so eroded that practically all of the original surface soil has been lost; the plow layer now consists of yellowish-red firm to very firm silty clay. In such areas there may be some shallow gullies or occasional deeper ones, most of which are indicated on the soil map by symbol. The amount of chert varies to some extent, especially in the subsoil.

Hermitage silt loam, eroded rolling phase, is moderately high in plant nutrients. Its content of organic matter ranges from medium to low, according to the amount of erosion. The soil is medium to strongly acid. Tilth of the plow layer varies; it is fairly good in less eroded areas but poor in more eroded areas. Where the soil is clayey, it puddles easily when wet and breaks to hard lumps if tilled when too dry.

Although the silty clay subsoil is only slowly permeable to water, the soil is moderately permeable to roots and moisture. Internal drainage is medium, and surface runoff is rather high. The capacity for holding moisture available to plants is moderately high in less eroded areas, but moderately low where erosion has been active. Erosion is a considerable hazard on practically all of this soil.

Use suitability.—All of this soil has been used for crops at some time. Cotton, corn, and lespedeza are among the most common crops grown. A small acreage is pastured. Some of the more eroded areas are idle or are used as unimproved pasture.

This soil is well suited to crops, but its moderately strong slope and the compact heavy surface soil in the more eroded areas limit its use and suitability. Generally moderately long rotations can be used in which close-growing crops, chiefly fall-sown small grains, and legumes and grasses for hay and pasture, predominate. This soil is suitable for most of the commonly grown field crops, including cotton, corn, small grains, and a wide variety of legumes and grasses for hay and pasture, such as alfalfa, sericea lespedeza, red clover, whiteclover, fescues, orchardgrass, and Dallisgrass. It responds well to proper management. Under good management, high yields can be maintained. Methods of use and management are discussed in group 8 in the section Use and Management of Soils.

Hermitage cherty silt loam, eroded undulating phase (2 to 6 percent slopes) (HJ).—Chert occurs throughout the plow layer and subsoil of this phase in quantities that interfere with cultivation. In general a larger percentage of this soil than of the undulating phase is eroded and as a result the plow layer in most places consists of a mixture of the original surface soil and subsoil. This soil was derived from local alluvium or old colluvium, much of which originated from cherty limestone.

Strips of this soil lie at the base of steep stony mountain slopes in the eastern and central parts of the county. Practically all of it is in the Hermitage-Talbott-Colbert soil association.

Profile description:

0 to 6 inches, grayish-brown to reddish-brown cherty silt loam.
6 to 11 inches, pale yellowish-brown to yellowish-red friable cherty silt loam that grades with depth to friable cherty silty clay loam; chert content generally a little less than in the surface layer.
11 to 28 inches, yellowish-brown to yellowish-red firm cherty clay; some splotches of yellowish brown, gray, and grayish yellow.
28 to 40 inches, mottled yellowish-gray, yellowish-brown, reddish-brown, and yellowish-red very firm cherty clay, sticky and plastic when wet and hard when dry; limestone bedrock normally occurs at depths of 4 to 10 feet, but it outcrops in a few places.

Some patches, especially on the stronger slopes, have lost practically all of the original surface soil, and the plow layer consists of yellowish-red cherty silty clay loam or cherty silty clay. In many places the larger chert fragments make up a great part of the subsoil below a depth of 28 inches.

In general, Hermitage cherty silt loam, eroded undulating phase, is high in plant nutrients. Internal drainage is medium to rather slow but is adequate for all crops common to the county. Erosion is a hazard, especially on the stronger slopes, in areas where the soil is loose or cultivated. Many characteristics of this soil vary according to degree of erosion. In the less eroded areas the content of organic matter is moderately high, permeability is moderate, and the capacity for holding moisture available to plants is moderately high. On the other hand, in the more eroded areas, organic-matter content is low, permeability is slow to very slow, and available moisture is restricted.

Use suitability.—All of this soil has been cultivated at some time. Cotton and corn are the principal crops, but some acreage is in soybeans, lespedeza for hay and pasture, grain sorghum, and sorghum for sirup. Some fertilizer is used, especially for row crops.

This soil is suitable for general farm crops, but chert interferes considerably with cultivation and mowing. The chert, however, apparently retards erosion, as it slows runoff and aids infiltration of moisture. The soil responds well to fertilization, and under good management yields of most crops are fairly high. It is not well suited to truck crops, because it is difficult to work and has a rather firm to very firm subsoil. Methods of use and management are discussed under group 3a in the section Use and Management of Soils.

Hermitage cherty silt loam, rolling phase (6 to 12 percent slopes) (HK).—This soil consists of old colluvium or local alluvium that sloughed or washed from soils developed over cherty limestone. Chert is common throughout the profile. The soil occupies moderately strong slopes. It is widely distributed throughout the Hermitage-Talbott-Colbert soil association at the base of steep stony mountain slopes in the eastern and central parts of the county.

The 5- to 8-inch surface layer is grayish-brown cherty silt loam. The subsoil is pale yellowish-brown to yellowish-red moderately firm cherty silt loam that grades to cherty silty clay loam. The lower part of the subsoil is yellowish-brown to yellowish-red very firm cherty clay that may be weakly splotched or mottled with shades of yellow and gray. Below a depth of about 24 inches the soil is mottled yellowish-gray, yellowish-brown, reddish-brown, and yellowish-red very firm cherty clay. Limestone bedrock is at depths of 3 to 8 feet. A few bedrock outcrops occur.

In general more chert is in the surface layer than in the subsoil directly below. In most places the deep subsoil increases in chert content below a depth of about 2 feet.

This soil is moderately productive. It contains a moderate supply of plant nutrients and organic matter. The upper layers are permeable to roots and moisture, but the deep subsoil is more slowly permeable because of the clay content. Generally the soil has good drainage. Internal drainage is medium, and the soil has a moderate capacity for holding moisture available to plants. Although chert interferes appreciably with tillage, it retards runoff water and aids infiltration of moisture.

Use suitability.—All of this soil is under cutover native deciduous forest, chiefly oaks and hickories. A few pines and cedars are intermixed. It can be cropped, but the chert content and the rather strong slope considerably limit its suitability for crops. It is suitable for cotton, corn, and most of the more desirable legumes and grasses for hay and pasture, but moderately long rotations must be used. The soil is responsive, and its productivity can be made fairly high. Methods of use and management are discussed in group 9 in the section Use and Management of Soils.

Hermitage cherty silt loam, eroded rolling phase (6 to 12 percent slopes) (HL).—This eroded rolling soil is the most extensive of the Hermitage soils and is widely distributed throughout the Hermitage-Talbott-Colbert soil association. Most of it occupies positions adjacent to and directly below the steep stony mountain slopes. A few limestone outcrops occur but do not interfere greatly with field work.

The 4- to 5-inch plow layer is usually grayish-brown to reddish-brown cherty silt loam to cherty silty clay loam. The subsoil, like that of the rolling phase, grades with depth from firm yellowish-red cherty silt loam to cherty silty clay. Below about 24 inches, the soil is a mottled, very firm cherty silty clay. Depth to limestone bedrock ranges from 3 to 8 feet.

Some patches have lost all of the surface soil. In these the plow layer is yellowish-red very firm cherty silty clay. A few small gullies occur in places, but most of these can be eliminated by use of heavy tillage implements.

Hermitage cherty silt loam, eroded rolling phase, has a moderately high content of plant nutrients. The supply of organic matter ranges from moderate in areas that are not so eroded to low in areas where erosion is more severe. The soil is medium to strongly acid. In general it is moderately permeable to roots and moisture, and its internal drainage is medium. The capacity for holding moisture available to plants is moderate except in the more severely eroded patches.

Use suitability.—This soil is used for crops and pasture. The main crops are corn, cotton, and hay (fig. 8). Common lespedeza is the chief pasture crop. Other crops less commonly grown are cowpeas, soybeans, potatoes, sweetpotatoes, and sorghum. Much of the soil is tilled on the contour. Row crops are commonly fertilized.

***Figure 8.*—Alfalfa on Hermitage cherty silt loam, eroded rolling phase; this is a good soil for alfalfa if it is properly fertilized and seeded.**

The range of crops that can be grown on this soil is limited by rather strong slopes and chertiness. The soil, however, is well suited to most of the general farm crops. It responds well to proper management and to moderately long rotations, and productivity can be maintained at a fairly high level. It is not suitable for truck crops, chiefly because of the chert and the shallow depth to the very firm clayey subsoil. Like the other Hermitage soils, it will support good pasture, although on the more eroded parts the moisture supply is restricted during the drier parts of the growing season. Methods of use and management are discussed in group 9 in the section Use and Management of Soils.

Hermitage cherty silty clay loam, severely eroded rolling phase (6 to 12 percent slopes) (HN).—Most of this soil occurs in small tracts and is associated with other Hermitage soils; all of it is in the Hermitage-Talbott-Colbert soil association. It occupies gentle valley slopes directly below the steep stony mountain areas.

The 4- to 5-inch plow layer consists of yellowish-red cherty silty clay loam or cherty silty clay, the texture depending upon the amount of material that has been eroded away. The subsoil is yellowish-red cherty silty clay that grades to mottled very firm cherty silty clay. Limestone bedrock occurs at depths of 2½ to 6 feet. An abundance of chert fragments have accumulated on the surface during the process of erosion. Small gullies are common, but most of them can be eliminated by using heavy tillage implements.

This soil is low in plant nutrients and organic matter and is medium to strongly acid. It is slowly permeable. Infiltration is greatly retarded by the clayey texture of the entire profile. The capacity for holding moisture available to plants is low, and areas are droughty during dry periods.

Use suitability.—All of this soil has been cropped at some time. At present about half of it is in unimproved pasture, and a small acreage has reverted to forest that is chiefly pine. Corn, cotton, and lespedeza for hay or pasture are the usual crops. Commonly corn or cotton is grown for 1 to 3 years and followed by 2 or 3 years of lespedeza.

This soil is not well suited to crop production, mainly because of slow permeability, droughtiness, poor workability, high chert content, and rather strong slope. The best use for most areas is permanent pasture. Under good management this soil affords good grazing, but insufficient moisture may retard the pastures. Use and management are discussed under group 12 in the section Use and Management of Soils.

Hermitage cherty silt loam, eroded hilly phase (12 to 25 percent slopes) (HM).—This phase has a considerable amount of chert throughout its profile and is at least moderately eroded in all areas. It consists of old colluvium or local alluvium derived from cherty limestone. It occupies positions on the valley slopes, adjacent to and directly below the stony steep mountain slopes. It is widely distributed throughout the Hermitage-Talbott-Colbert soil association.

The surface soil varies according to the amount of erosion. In most places the 4- to 6-inch plow layer is grayish-brown to reddish-brown cherty silty clay loam or cherty silt loam. The subsoil is predominantly yellowish-red firm cherty silty clay. Bedrock occurs at depths of 2½ to 6 feet.

On a small acreage that has not been eroded, the 8-inch surface layer is grayish-brown cherty silt loam. In contrast, a considerable acreage on the stronger slopes has lost practically all of the original surface soil and in places part of the subsoil through erosion. On these areas the plow layer consists of yellowish-red firm to very firm cherty silty clay. The amount of chert varies; in some places it is so abundant that tillage is very difficult; in other places, although not so abundant, it is sufficient to interfere with field work. A few limestone outcrops occur.

Some characteristics of Hermitage cherty silt loam, eroded hilly phase, vary according to degree of erosion. In the less eroded areas, the supply of organic matter is fair and the soil is moderately fertile, permeability is moderate to moderately rapid, and the capacity for holding moisture available to plants is moderately high. On the other hand, the more eroded areas have little organic matter, slow permeability, and rather low moisture-holding capacity. Internal drainage of this eroded hilly phase is medium.

Use suitability.—Except for a very small acreage, all of this soil has been cropped at some time. Much of the soil is in unimproved pasture. Lespedeza and Dallisgrass are among the more common of the volunteer legumes and grasses that afford grazing. Only a small part of this soil is cropped. Corn is the chief crop, but some cotton, soybeans, and cowpeas are also grown. Crop yields in general are low. Little fertilizer is used. A few farmers raise corn for 2 or 3 years and follow it with voluntary pasture. Corn is usually not fertilized extensively, but cotton, if it follows the corn, is fertilized at a moderate rate. The uncleared areas of this soil are covered by cutover forest, chiefly oak and hickory. Some pines and cedars are intermixed. A small acreage, once cleared, has reverted to forest that is chiefly pine, locust, persimmon, and sassafras.

Chiefly because of the strong slope, chertiness, and, in places, severe erosion, this soil is not well suited to cultivated crops. It affords a fair amount of grazing if the fertility is brought to a high level and the soil is properly seeded. The least eroded areas have sufficient moisture for considerable grazing. On the more severely eroded areas, grazing is restricted because of the small amount of moisture available to plants. Methods of use and management are discussed under group 13 in the section Use and Management of Soils.

Hollywood silty clay (0 to 2 percent slopes) (Hr).—This is the darkest colored soil in the county. Often it is referred to as black clay land. It is on very gentle slopes in the limestone valleys. It is shallow to bedrock limestone, and much of the material is local alluvium washed from adjacent higher lying areas of soils derived from limestone; Stony smooth land, Talbott and Colbert soil materials; and rolling, hilly, and steep areas of Rockland, limestone. Water draining from these high-lime areas is probably chiefly responsible for the predominantly slightly acid to alkaline reaction of the soil. Some of the acreage occupies parts of depressional flats along drainageways, and in these areas the alluvium is thicker and internal drainage is somewhat slower.

Most of Hollywood silty clay is in the southeastern part of the county in the Holston-Tupelo-Robertsville soil association. In general, it is a part of broad smooth landscapes and is associated with Tupelo and Colbert soils.

Profile description:

0 to 5 inches, dark grayish-brown firm silty clay moderately friable under optimum moisture but plastic when wet and hard when dry.
5 to 20 inches, olive-tinted very dark gray silty clay or very firm clay; a few faint mottlings; the mass breaks to small angular fragments under optimum moisture but is very plastic when wet and very hard when dry.
20 to 36 inches+, very dark gray very firm clay, mottled with brown and yellowish red; very plastic when wet and very hard when dry; limestone bedrock occurs at depths of 1 to 5 feet.

Occasional limestone outcrops occur, and in areas shallowest to bedrock the soil material may be residual from the underlying rock. In the higher lying, better drained areas, the surface soil is lighter colored and the subsoil more yellowish. In the lowest lying areas, such as those along the drainageways, the surface soil is darker and the subsoil grayer and thicker.

Hollywood silty clay is high in plant nutrients and fairly high in organic matter. It is slightly acid to slightly alkaline. Tilth of the plow layer is fairly good under optimum moisture. The range of optimum moisture is very narrow, however, and the soil is difficult to work when a little too wet or too dry. Permeability and internal drainage are slow. Usually the slope is sufficient to remove excess runoff except in a few places. Erosion is not a serious hazard.

Use suitability.—Most of this acreage has been cleared and used for crops (fig. 9). At present much of it is in permanent pasture or is in such crops as corn, soybeans, and grain sorghum. Small grains, chiefly wheat, oats, and rye, are grown to some extent.

The high fertility and smooth surface make this soil favorable for crop production, but its clayey texture and slow internal drainage limit the number of crops to which it is suited. Hay and pasture and, to a less extent, small grains are among the better suited crops. Although cotton and corn produce fairly well, they are harder to till on this soil than on some of the more friable well-drained soils. Use and management methods are discussed under group 6 in the section Use and Management of Soils.

***Figure 9.*—Grain sorghum on Hollywood silty clay; this crop grows well on many soils, including those that are heavy and slowly drained.**

Hollywood silty clay, eroded undulating phase (2 to 4 percent slopes) (Hs).—Practically all of this soil occupies gentle slopes below steep areas of Rockland, limestone, but above broader areas of Hollywood silty clay.

The 4- to 5-inch plow layer is dark grayish-brown silty clay. The subsoil is very dark gray silty clay that grades at a depth of about 15 inches to very dark gray very firm clay mottled with brown and yellowish red. Limestone bedrock is at depths of ½ to 4 feet.

The soil is moderately high in plant nutrients and organic matter. It is slightly acid to slightly alkaline. Tilth is fairly good if moisture is favorable, but poor if the soil is either slightly dry or slightly wet. Internal drainage is slow. Surface runoff accumulates rapidly during rains because of the very slow permeability of the soil.

Use suitability.—Most of this soil is used for crops or pasture. Corn, soybeans, and grain sorghum are the chief crops. Some acreage is in small grains and cotton.

The high fertility and smooth surface make the soil suitable for crop production. Its clayey texture and slow internal drainage, however, limit the kind of crops that can be grown successfully and make tillage much more difficult than on the many soils that are more friable and permeable. This soil is best used for hay and pasture. It is also suitable for small grains. Use and management are discussed under group 6 in the section Use and Management of Soils.

Holston fine sandy loam, undulating phase (2 to 6 percent slopes) (Hu).—Like other Holston soils, this is a moderately well drained yellowish loamy soil. It consists of old mixed general alluvium derived from sandstone, limestone, and shale, but predominantly from sandstone and shale. It occupies positions on moderately high stream terraces in the southeastern part of the county in the Holston-Tupelo-Robertsville soil association.

Profile description:

0 to 11 inches, light yellowish-brown very mellow friable fine sandy loam; the surface 2 to 3 inches in uncultivated areas is a little darker and higher in organic matter than the lower part of the layer.

11 to 30 inches, yellowish-brown to yellow friable to firm fine sandy clay loam; lower part of this layer weakly mottled in places.

30 to 42 inches +, moderately mottled to strongly mottled yellowish-gray, yellowish-red, and reddish-brown brittle very firm fine sandy clay; limestone bedrock is usually at depths of 3 to 15 feet.

In some places the fine sandy loam surface layer is thinner, not exceeding 7 or 8 inches. In some areas the friable fine sandy clay loam subsoil extends to a depth of 40 inches, but in others the very firm fine sandy clay is within 30 inches of the surface.

Holston fine sandy loam, undulating phase, is low in natural fertility and very low in content of organic matter. It is medium to strongly acid. To a depth of 30 inches, it is moderately permeable to both roots and moisture. Internal drainage depends upon the depth to the very firm clayey material; it ranges from medium to slow. The capacity for holding moisture available to plants is moderate. Tilth of the plow layer is very favorable. Except on the stronger slopes, erosion is not great.

Use suitability.—Much of this soil is used for corn, cotton, soybeans, grain sorghum, potatoes, sweetpotatoes, winter grains, and hay, and some is in truck crops. Rather short rotations prevail, and some fertilizers are used, especially for row crops.

This soil is moderately productive and is easily worked and conserved. In order to obtain high yields, however, heavy applications of fertilizer are necessary. The soil is suitable for short rotations, if carefully managed, and suited to a number of crops, including corn, cotton, sorghum, small grains, and soybeans and most of the more desirable legumes and grasses for hay and pasture. The more sloping areas require careful control of runoff water. Use and management methods are discussed under group 4 in the section Use and Management of Soils.

Holston fine sandy loam, eroded undulating phase (2 to 6 percent slopes) (Hv).—A great part of this soil occurs on broad smooth landscapes consisting of poorly drained soils not well suited to crops and of moderately well drained to well drained soils well suited to crops. Most of this phase is in the southeastern part and along the southern edge of the county in the Holston-Tupelo-Robertsville soil association.

The 5- to 6-inch plow layer usually consists of light yellowish-brown fine sandy loam or fine sandy clay loam. The subsoil is yellow to yellowish-brown fine sandy clay loam. Below a depth of about 27 inches, the soil is mottled firm to very firm fine sandy clay. Limestone bedrock ranges from 3 to 15 feet.

Some patches have lost practically all of the surface soil, and the plow layer consists of yellowish-brown fine sandy clay loam. A few small gullies may occur in these areas, but most of them can be obliterated by using heavy tillage implements. Some small tracts are somewhat poorly drained. In these tracts the subsoil is mottled at a depth of 12 inches.

Holston fine sandy loam, eroded undulating phase, is low in fertility and content of organic matter. It is medium to strongly acid. Tilth of the plow layer varies according to the amount of erosion. In the more eroded areas, tilth is less favorable than in areas that are not so eroded, and the soil is inclined to be cloddy. Moisture and roots penetrate the soil fairly easily. Internal drainage depends upon the depth to the firm substratum; it ranges from medium to slow. Except on the eroded areas, where the moisture supply is limited, the capacity for holding moisture available to plants is moderate.

Use suitability.—Much of this soil is used for crops. Some of the land is in pasture and a small acreage has reverted to forest. If well managed, the soil is productive. It is suited to cotton, corn, small grains, soybeans and a number of legumes and grasses for hay and pasture, and some truck crops, including potatoes, tomatoes, and strawberries. Moderately short rotations should be used. The soil responds well to adequate fertilization. Erosion is somewhat of a hazard on the more sloping areas, but it is not difficult to control. Areas that are not so well drained can be improved by installing artificial drainage, although this practice may not be feasible because of cost. Use and management are discussed under group 4 in the section Use and Management of Soils.

Holston fine sandy loam, level phase (0 to 2 percent slopes) (Ht).—This soil differs from the undulating phase of Holston fine sandy loam chiefly in having a nearly level surface. Other differences are slower internal drainage, a little lighter colored surface layer, and a subsoil that is a little lighter yellow. It occupies areas on moderately high stream terraces and is associated with Monongahela and with other Holston soils in the Holston-Tupelo-Robertsville soil association. Most of the acreage is in the southeastern part of the county.

The 10- to 12-inch surface layer is pale-brown to light brownish-gray fine sandy loam. The subsoil to a depth

of about 24 inches is light yellowish-brown to yellow firm fine sandy clay loam, faintly mottled with gray in the lower part. The underlying material is mottled yellowish-gray, yellowish-red, and reddish-brown firm to very firm fine sandy clay. Limestone bedrock is at depths of 3 to 15 feet.

Surface runoff is slow, and permeability is moderate. The soil has a high capacity for holding moisture available to plants. Tilth of the plow layer is good. This soil is moderately low in fertility and organic-matter content. It is medium to strongly acid.

Use suitability.—Most of the acreage is cultivated. Corn, soybeans, and grain sorghum are among the chief crops. Some hay is grown. Other common crops are potatoes, sweetpotatoes, truck and berry crops, and sorghum for sirup. Only a small acreage is planted to cotton.

This soil is easily worked and conserved. It is suitable for a number of crops, including corn, small grains, most of the more desirable legumes and grasses for hay and pasture, and many truck crops. Its slow internal drainage and slow runoff cause it to warm slowly in the spring. Therefore, it is not so favorable for cotton as some of the better drained higher lying soils. It responds well to good management and is especially favorable for crops that need a great deal of moisture during the drier part of the growing season. Erosion is not a hazard. If feasible to install, artificial drainage would improve much of the soil for general agricultural use. In most areas shallow surface ditches would improve the productivity and workability considerably. Use and management are discussed under group 4 in the section Use and Management of Soils.

Humphreys silt loam (0 to 6 percent slopes) (Hx).—This is a moderately well drained yellowish soil. It occurs on moderately young low stream terraces. It consists chiefly of materials derived from cherty limestone. The soil is nearly level to gently undulating in most places. The slope rarely exceeds 4 percent. Some of the areas have short gentle escarpments, but the drop is usually less than 3 or 4 feet. This soil occupies rather small areas along creeks in the Dickson-Lawrence soil association and in the adjoining part of the Decatur-Cumberland-Abernathy soil association.

Profile description:

0 to 7 inches, yellowish-brown friable silt loam that in places contains a few chert fragments.
7 to 28 inches, dark yellowish-brown to yellowish-brown moderately firm silty clay loam; a few chert fragments in places.
28 to 48 inches, yellowish-brown moderately firm silty clay loam mottled with brownish gray or gray, the mottling increasing with depth; chert in a matrix of clay commonly occurs at about 48 inches; bedrock occurs at depths of 4 to 20 feet.

The profile described above is typical of areas of Humphreys silt loam that are closely associated with Dickson soils. Many areas associated with the Baxter, Cookeville, and the redder soils, however, have a browner surface layer and a more brownish or reddish-brown subsoil that approaches the color of the Etowah subsoils. The texture of the surface layer ranges from silt loam to somewhat gritty silt loam that contains a noticeable amount of chert. The depth to this cherty layer and its thickness vary widely. In places these chert beds are thick enough to be used for road material.

Humphreys silt loam is generally a moderately fertile soil, and its content of organic matter is moderate. Fertility and organic-matter content are somewhat lower in areas closely associated with the Dickson soils and considerably higher in those associated with the Baxter, Cookeville, and Dewey soils. The soil is medium to strongly acid. The surface layer has good tilth, and the soil can be worked over a wide moisture range. Internal drainage is moderate to moderately slow, and runoff is medium. The soil has a high capacity for holding moisture available to plants. Runoff water is not a great hazard, except in a few areas of stronger slope.

Use suitability.—Most of this soil has been cleared. Corn, soybeans, lespedeza, and sorghum are among the most common field crops. Some cotton is grown, but the soil is not so well suited to it as are some of the better drained soils. Yields in general are moderately high, but they depend largely upon the amount of fertilizer that is added.

The smooth surface, favorable tilth, ability of the soil to respond to good management, and the abundant moisture held available to plants, make this a desirable soil for agricultural use. It is suited to a number of crops, including corn, small grains, and most of the more desirable legumes and grasses for hay and pasture. It is also suited to certain truck crops, such as cabbage, tomatoes, green beans, and melons. Its somewhat impaired drainage delays tillage at times. For this reason it is not so well suited to early spring crops and cotton. It is suitable for permanent pasture because during the drier parts of the growing season its moisture supply is greater than in the higher lying better drained soils. Use and management are discussed under group 2 in the section Use and Management of Soils.

Humphreys cherty silt loam (0 to 6 percent slopes) (Hw).—This soil consists of moderately young general alluvium derived mainly from cherty limestone. It differs from Humphreys silt loam in having a greater abundance of chert throughout the profile. It occupies positions on low stream terraces. Many areas are associated with the Dickson soils in the Dickson-Lawrence soil association. Much of this soil, however, is in the Decatur-Cumberland-Abernathy soil association and lies along streams that have their headwaters in the Dickson-Lawrence soil-association area.

The topmost 12 inches is dark grayish-brown to yellowish-brown cherty loam or cherty silt loam; the lower part is cherty clay loam in places. Below the surface layer, to a depth of about 36 inches, the soil is dark yellowish-brown to yellowish-brown moderately firm cherty clay, somewhat mottled with reddish yellow and brownish gray. The clay content increases with depth. The underlying material is gray firm sticky cherty clay, mottled with yellowish red and brown. Much of this material is tight in place and is slowly pervious to water. Limestone bedrock occurs at depths of 4 to 20 feet.

The chert content varies considerably. In some areas chert fragments are 6 inches or more in diameter; in others, few fragments exceed 2 or 3 inches. Those areas associated with the Dickson soils are light colored and are lower in fertility than those associated with the Baxter and Dewey soils. Areas associated with the Baxter and Dewey soils are browner and higher in fertility.

Humphreys cherty silt loam is a moderately fertile soil, but its supply of organic matter is not high. It is medium to strongly acid. The soil is permeable to moisture and roots, and internal drainage is medium to slow. Occasionally some areas are flooded.

Use suitability.—Practically all of this soil was once cropped. Now, probably not more than 40 percent of it

is cultivated and the rest is used mainly for pasture. Cotton, corn, and soybeans are the chief crops.

Although this soil is suitable for crops, the chert content makes it hard to work and unsuitable for crops that require mowing. The most cherty areas have limited suitability for crops and pasture because they are droughty and lack fertility. Row crops can be grown intensively on most areas, as erosion is not a great hazard. Use and management are discussed under group 2 in the section Use and Management of Soils.

Huntington silt loam (0 to 4 percent slopes) (Hz).—This is a well-drained, brown, permeable soil on bottom lands. It was derived mainly from limestone material that was intermixed with some material from sandstone and shale. This soil is more extensive than Huntington fine sandy loam and is free of sand.

Practically all of Huntington silt loam occurs along the larger streams in the southern part of the county. The largest areas are along the Flint River, but other areas are along the Tennessee River and Huntsville Spring Branch. The soil lies on the higher parts of the bottom lands and is associated with Lindside silty clay loam and with Huntington fine sandy loam. Most of the acreage is a part of smooth or nearly level landscapes that are generally suitable for cultivation. Practically all areas of this soil are subject to overflow but are among the last on the bottom lands to be flooded.

Profile description:

0 to 20 inches, dark-brown to dark yellowish-brown friable but rather heavy silt loam that crushes to a mellow mass; the lower 10 or 12 inches is generally lighter brown.
20 to 30 inches, faintly mottled yellowish-brown, dark-brown, and brownish-yellow slightly firm but friable silty clay loam that has a weak blocky structure.
30 to 42 inches +, mottled yellowish-brown, gray, and dark-brown moderately firm but friable silty clay loam; limestone bedrock usually occurs at depths of 5 to 20 feet or more.

In places, especially along creeks or smaller streams, the subsoil is more nearly friable silt loam and lacks the firmness characteristic of much of the acreage along the Tennessee River. All of the areas along the Tennessee River have a noticeable amount of fine mica flakes, which have been carried by streams from the mountain areas far to the northeast and east.

Huntington silt loam is slightly acid to medium acid. Its content of plant nutrients and organic matter is moderate to high, and in general it is one of the most productive soils in the county. The plow layer has good tilth, and the soil is moderately permeable to very permeable to moisture and roots. Internal drainage is medium, and the capacity for holding moisture available to plants is high. Except for some areas along the Tennessee River, which are protected by flood-control reservoirs, practically all of this soil receives fresh deposits of silty material periodically from floodwaters.

Use suitability.—Most of this soil is planted regularly to crops. Corn is the principal crop. In many areas it is grown several years in succession, but occasionally it is followed by hay or pasture in short rotations. A small amount of cotton is grown. Except for the cotton crop, little fertilizer is used.

Its smooth surface, high fertility, and permeability make this soil one of the most suitable for intensive use. Floods, however, somewhat limit its use. Small grains commonly lodge, and cotton is less productive on this soil than on some of the higher, better drained soils. The slowness with which excess water leaves the soil after rains, delays cultivation. Among the best suited crops are corn, soybeans, sorghum, and, except possibly alfalfa, practically all the legumes and grasses for hay and pasture. Although this is one of the most fertile soils in the county, it responds well to fertilization. Use and management are discussed under group 1 in the section on Use and Management of Soils.

Huntington fine sandy loam (0 to 2 percent slopes) (Hy).—This soil is more sandy than Huntington silt loam. It is a brown well-drained soil that consists of mixed general alluvium strongly influenced by limestone material. In Madison County this soil is a mixture of sandstone, shale, and limestone residuum. Most of it occupies bottom lands along the larger streams in the southern part of the county. It is most extensive along the Tennessee, Flint, and Paint Rock Rivers, and along Huntsville Spring Branch. Most of the acreage lies in very gently undulating strips adjacent to stream channels. Practically all of it is subject to overflow. Its position, however, is higher than that of the associated soils on bottom lands, so it is therefore one of the last to be flooded.

Profile description:

0 to 16 inches, grayish-brown to dark yellowish-brown friable fine sandy loam that grades to yellowish brown with depth.
16 to 36 inches, yellowish-brown to dark yellowish-brown somewhat firm but friable fine sandy clay loam.
36 inches +, grayish-brown, dark-brown, and yellow faintly to moderately mottled friable fine sandy clay loam; limestone bedrock usually occurs at depths of 5 to 20 feet or more.

The texture of this soil varies considerably in the surface layer and sublayers. In some places the surface layer is fine sandy loam or even loamy fine sand underlain at a depth of about 10 inches by silt loam or silty clay loam. In other areas the surface layer is heavy fine sandy loam or loam underlain at depths of 10 to 15 inches by fine sandy loam or fine sandy clay loam. In a few places, it consists of stratified loamy fine sand, fine sandy loam, and silt loam.

Huntington fine sandy loam is a moderately fertile soil, and its content of organic matter is moderate. It is slightly to medium acid. The tilth of the plow layer is very favorable, and both moisture and roots penetrate the soil easily to a considerable depth. This soil has a moderate capacity for holding moisture available to plants. Except that floods are a hazard, moisture conditions are generally very good for crop production.

Use suitability.—Practically all of this soil is used for crops. Row crops predominate and are planted on some areas for many years in succession. Corn is the principal row crop; other crops are cowpeas, peanuts, potatoes, sweetpotatoes, melons, some cotton, and hay, which is chiefly lespedeza and soybeans. Yields are moderately high, although fertilizers are not used extensively.

The smooth surface, good tilth, and favorable moisture make this one of the most desirable soils in the county for crops. If moderate amounts of fertilizer are applied, it is well suited to intensive use. It is suitable for numerous crops, including cotton, especially the better drained, higher lying areas. It is also suitable for alfalfa, but floods are a hazard. Use and management are discussed under group 1 in the section Use and Management of Soils.

Jefferson fine sandy loam, undulating phase (2 to 6 percent slopes) (Je).—This soil, like other soils of the Jefferson series, is light colored, well drained, and sandy. It occupies old colluvial slopes and consists predominantly of material derived from sandstone. In Madison County

some material from shale and limestone is intermixed. Practically all of this soil is in the Allen-Jefferson soil association, which lies as strips at the base of some of the steep stony mountain slopes.

Profile description:

0 to 10 inches, pale-brown very friable fine sandy loam.
10 to 26 inches, yellowish-brown friable but firm fine sandy clay loam.
26 to 42 inches, splotched or mottled yellowish-brown, yellow, and reddish-yellow friable but firm fine sandy clay loam; limestone bedrock occurs at depths of 3 to 8 feet or more.

Where this soil is closely associated with Colbert soils, the subsoil is usually very sticky and clayey at a depth of 30 inches. Some sandstone fragments lie on the surface and occur throughout the profile, but they are not so abundant as to interfere greatly with tillage. A few limestone fragments have sloughed or rolled from the slopes above.

Jefferson fine sandy loam, undulating phase, is low in content of plant nutrients and organic matter and is medium to strongly acid. Tilth is good in the plow layer, and the soil is easily worked to a fine seedbed. Permeability to both moisture and roots is moderately rapid; internal drainage is medium to rapid. The soil has a fair capacity for holding moisture available to plants. A few places on the lower slopes are subject to seepage water. In these areas internal drainage is slow, and moisture may be excessive.

Use suitability.—A great part of this soil has been cleared, and much of it is now cropped. Corn and cotton predominate, but some soybeans, cowpeas, lespedeza for hay, and a small acreage of sorghum, potatoes, and truck crops for home use are grown. Although most row crops are fertilized, yields under usual conditions are not high.

The good tilth, smooth surface, and moderately favorable moisture make this soil well suited to crops. It responds well to adequate fertilization. Under good management it is suited to many crops, especially to cotton, corn, soybeans, small grains, many of the legumes and grasses for hay, and some truck crops such as potatoes and beans. The stronger slopes are likely to erode to some extent. Usually rotations of moderate length are suitable. Methods of use and management are discussed under group 4 in the section Use and Management of Soils.

Jefferson fine sandy loam, eroded undulating phase (2 to 6 percent slopes) (JF).—This eroded phase is the most extensive of the Jefferson soils and occurs mainly south and east of Huntsville. It is widely distributed throughout the Allen-Jefferson soil association, which occurs as strips along the base of some of the steep stony mountain slopes.

The 4- to 5-inch plow layer is brownish-yellow fine sandy loam. The subsoil is yellowish-brown moderately firm but friable fine sandy clay loam. It grades at 30 inches to somewhat splotched or mottled yellow, brownish-yellow, and brown firm fine sandy clay loam. Limestone bedrock occurs at depths of 3 to 8 feet.

Practically all of the surface soil has been lost in a few areas. In such places the plow layer consists of yellowish-brown firm fine sandy clay loam. A few small gullies occur, but they can usually be eliminated by use of ordinary tillage implements. A few sandstone and limestone fragments are on the surface and throughout the profile, but they do not interfere materially with cultivation.

This soil is low in plant nutrients and organic matter. It is medium to strongly acid. Except in the most severely eroded areas, the plow layer has good tilth. The soil is generally permeable to both roots and moisture. Internal drainage is medium, and the capacity for holding moisture available to plants is fair. In a few small patches on the lower slopes, seepage water impairs internal drainage to some extent. Runoff develops rather rapidly because of the slope and causes erosion if the soil is cultivated.

Use suitability.—Much of this soil is used for crops. Cotton, corn, and hay, chiefly lespedeza, predominate. Usually, fertilizer is used for cotton. Corn is not fertilized so heavily at planting time, but generally it receives a sidedressing of nitrate of soda.

The smooth surface, good tilth, and moderately favorable moisture make this soil fairly well suited to crops, but comparatively heavy applications of fertilizer are needed for high yields. The soil responds well to good management and is suitable for a number of crops, principally cotton, corn, sorghum, soybeans and many of the legumes and grasses for hay, and several truck crops such as potatoes, beans, and tomatoes. It is suitable for pasture, but a good sod is somewhat more difficult to establish than on some of the more silty soils. Methods of use and management are discussed under group 4 on the section Use and Management of Soils.

Jefferson fine sandy loam, eroded rolling phase (6 to 12 percent slopes) (JG).—In most areas the plow layer of this soil, as a result of erosion, consists of a mixture of surface soil and former subsoil. The total acreage is not large. The separate areas are small and occur mainly east and south of Huntsville. Usually they are associated with the smoother Jefferson soils in areas of the Allen-Jefferson soil association that lie at the base of the steep, stony mountain slopes.

The surface layer to a depth of about 5 inches is predominantly brownish-yellow fine sandy loam. The subsoil is yellowish-brown moderately firm but friable fine sandy clay loam that grades to weakly splotched or mottled yellow, brown, and yellowish-gray firm fine sandy clay loam at a depth of about 28 inches. Limestone bedrock is at depths ranging from 2 to 7 feet.

Some patches have lost practically all of the surface soil, and here the plow layer consists of yellowish-brown firm fine sandy clay loam. In many places the substratum is more clayey in texture and contains some chert that is residiuum from limestone. Some sandstone and limestone fragments occur on the surface and throughout the profile, but they are not numerous enough to interfere materially with cultivation.

Jefferson fine sandy loam, eroded rolling phase, is medium to strongly acid and rather low in fertility and organic matter. The plow layer has fairly good tilth except in the more eroded areas, where tilth is poor because of the clayey texture of the soil. Moisture and roots penetrate the soil easily, and internal drainage is medium. Except in the more eroded areas, the soil has a fair capacity for holding moisture available to plants. Such eroded areas are droughty during the drier parts of the growing season.

Use suitability.—All of this soil has been cropped at some time; at present only about half is in crops. Some acreage is idle, but much of the soil that is not in crops is used for unimproved pasture. Corn and cotton are the main crops; some acreage is in soybeans, cowpeas, sorghums, and lespedeza. Yields generally are not high. Except for cotton, which receives moderate amounts of mixed fertilizer, only light applications of fertilizer are used.

This soil is fairly well suited to crops that need tillage. However, its moderately strong slope and low fertility limit its range of suitability. It is suitable for many crops, including corn, cotton, small grains, a wide variety of legumes and grasses for hay, and some truck crops. Row crops should not be grown frequently. They can be grown, however, in rotations of moderate length if close-growing crops predominate. The soil in general is responsive to good management, and much of the acreage can be made fairly productive. Methods of use and management are discussed under group 11 in the section Use and Management of Soils.

Jefferson stony fine sandy loam, eroded rolling phase (6 to 12 percent slopes) (JH).—This soil differs from Jefferson fine sandy loam, undulating phase, mainly in having a stronger slope, enough stones in the surface layer to interfere with cultivation, and a significant loss of original surface soil through erosion. Like the other Jefferson soils, this phase consists of old local alluvium and colluvium derived largely from sandstone. Some material from limestone and shale is intermixed.

Practically all of this soil is in the Allen-Jefferson soil association, south and east of Huntsville. Most areas are closely associated with the smoother, less stony Jefferson soils.

The 4- to 5-inch plow layer, which consists of a mixture of the original surface soil and subsoil, is predominantly brownish-yellow stony fine sandy loam. The subsoil is yellowish-brown stony moderately firm but friable fine sandy clay loam. It grades with depth to moderately splotched or mottled yellow, yellowish-gray, and brown firm fine sandy clay loam. Limestone bedrock occurs at depths of 2 to 7 feet.

All of the original surface soil has been eroded from many patches, and the plow layer consists of firm yellowish-brown stony fine sandy loam or stony fine sandy clay loam. A few small gullies occur in these areas, but usually they can be obliterated by using heavy tillage implements.

The stone fragments in this soil are usually less than 12 inches in diameter but range from very small to about 24 inches. In places there are some chert fragments and loose limestone rock; a few limestone outcrops occur. A few small areas have a slope greater than 12 percent, and about 40 percent of the acreage has slopes of less than 6 percent.

Jefferson stony fine sandy loam, eroded rolling phase, is low in plant nutrients and organic matter and is medium to strongly acid. The less eroded areas are easily penetrated by roots and moisture. The more eroded areas have somewhat unfavorable tilth, are less permeable, and have a rather low capacity for holding moisture available to plants. Internal drainage is medium, and surface runoff is rapid.

Use suitability.—About half of this soil is used for crops; most of the rest is either idle or is pastured. Corn, cotton, and lespedeza are the principal crops grown. A small acreage, mainly on the steeper slopes, is still under native forest. The forest cover is predominantly deciduous hardwoods, chiefly oak. Some pines and cedars are intermixed.

Although the soil is suitable for cultivated crops, its strong slope, low fertility, and stoniness greatly limit its usefulness. If carefully managed it is fairly suitable for cotton, corn, sorghum, and soybeans or other plants used for hay or pasture. The stones, however, interfere greatly with tillage and mowing. Rotations must be of moderate length or long if the soil is to be kept productive. Methods of use and management are discussed under group 11 in the section Use and Management of Soils.

Lawrence silt loam (0 to 2 percent slopes) (LA).—This is a somewhat poorly drained yellowish soil developed over cherty limestone. It occurs in slight depressions, practically all of which have inadequate outlets for surface drainage. Surface runoff is therefore very slow. This soil is associated with Dickson soils in the Dickson-Lawrence soil association in the northwestern part of the county. The separate areas are moderately large and are part of more extensive areas of smooth soils that are suitable for cultivation.

Profile description:

0 to 12 inches, light yellowish-brown to pale-brown friable silt loam that crumbles easily to a mellow mass; in uncultivated areas the surface 1 inch or so is a little darker and contains some partly decomposed roots and leaves.
12 to 24 inches, brownish-yellow friable but firm silty clay loam mottled with light gray and yellowish brown.
24 to 36 inches, strongly mottled light-brown, yellowish-red, and light brownish-gray very firm brittle silty clay; compact in place but forms a fairly friable mass when crushed: commonly known as a pan: Cherty limestone bedrock is at depths of 15 to 40 feet.

Thickness of the soil layers above the pan ranges from 18 to 26 inches. In most areas this soil is free of chert to a depth of 30 to 36 inches and the silty surface resembles loessal, or windblown, material.

Lawrence silt loam is low in content of plant nutrients and organic matter and is medium to strongly acid. The more friable material in the topmost 18 to 30 inches is permeable to roots and moisture, but the compact pan causes slow internal drainage. The moderately high capacity of the upper layers to hold moisture available to plants and the depressed position give this soil a more adequate moisture supply during much of the growing season than some of the higher lying better drained soils. During the wetter parts of the growing season, drainage is inadequate. Consequently, the soil is cold, and field work is delayed considerably after wet periods. It is often necessary to postpone field work until late in spring. Harvesting also may be delayed by an unusually wet season.

Use suitability.—About 65 percent of this soil has been cleared, and most of it was cultivated at some time. The rest is under decidous forest consisting chiefly of oak and hickory. Corn and cotton are the chief crops, but cotton can be grown only on the better drained land. Other commonly grown crops are grain sorghum, soybeans, field peas, and common lespedeza.

This soil is suitable for crop production because of smooth surface, good tilth when dry, and responsiveness to fertilization. Its poor drainage, however, limits its range of suitability and makes it poorly suited to alfalfa and cotton. If adequately fertilized, it is suited to such row crops as corn and soybeans, and to the more moisture-tolerant legumes and grasses for hay and pasture.

If feasible, probably all of the acreage could be improved by installing shallow surface ditches or tile drainage. This is one of the most desirable soils for improved pasture because of its good moisture supply during midsummer. Use and management are discussed under group 6 in the section Use and Management of Soils.

Lee silt loam (0 to 2 percent slopes) (LE).—This is a poorly drained grayish soil of the bottom lands. It resembles the Melvin, Prader, Tyler, Robertsville, and Guthrie soils in degree of drainage. It differs from

Melvin silty clay loam, however, in consisting of young general alluvium derived from low-grade cherty limestone. In contrast, the Melvin soil consists of general alluvium derived mainly from high-grade limestone.

Lee silt loam occurs on low bottom lands along streams that originated in the cherty limestone area in the northwestern part of the county that is occupied by the Dickson-Lawrence soil association. Along the larger creeks, it is associated with Ennis and Humphreys soils. Because of its position, it is the first soil of the bottom lands to be subject to overflow.

Profile description:

0 to 6 inches, grayish-brown mellow silt loam.
6 to 22 inches, light-gray friable silt loam mottled with pale yellow and brownish yellow; grades to a silty clay loam in some areas.
22 to 36 inches, mottled light-gray and light yellowish-brown silty clay loam; cherty limestone bedrock occurs at a depth of 5 feet or more.

A small amount of chert occurs throughout the profile in some places, and generally there is a considerable amount of chert in the subsoil.

Lee silt loam is low in content of plant nutrients and organic matter and is generally medium acid. Both surface runoff and internal drainage are very slow. Tilth of the plow layer is favorable. The upper part of the soil is permeable to roots and moisture, but the high water table retards the development of roots.

Use suitability.—Little of this soil has been improved for cultivation, although part of it has been cleared. These cleared areas are mainly pastured, though some are cultivated. The chief practice needed to make this soil more suitable for crops is improved drainage. Areas where drainage can be improved are well suited to permanent pasture and to such crops as corn and soybeans, lespedeza, and other legumes and grasses. Somewhat heavy applications of fertilizer are necessary to make the soil highly productive, however. Methods of use and management are discussed in group 14 in the section Use and Management of Soils.

Lee-Lobelville silt loams (0 to 2 percent slopes) (Lo).—This unit consists of areas of Lee and Lobelville silt loams so closely associated that it was impractical to map them separately. The profile description of Lee silt loam already has been described. Lobelville silt loam is an imperfectly or somewhat poorly drained soil. It consists of general alluvium derived from soils that developed from cherty limestone. All areas of Lee-Lobelville silt loams occupy positions along creeks or rivers, the headwaters of which are in the Dickson-Lawrence soil association. They are subject to overflow.

Profile of Lobelville silt loam:

0 to 14 inches, grayish-brown to light brownish-gray mellow silt loam, faintly mottled with gray, yellow, and brown; the upper 3 or 4 inches may be free of mottling.
14 to 30 inches, mottled brownish-gray, brownish-yellow, yellowish-brown, and a yellowish-red friable silty clay loam.
30 to 48 inches, light brownish-gray silty clay or silty clay loam strongly mottled with gray, yellow, and yellowish brown; moderately sticky and plastic when wet; at depth of 36 to 40 inches there may be an abundance of chert: cherty limestone bedrock occurs at depths of 5 feet or more.

The soils of this mapping unit are moderately low in fertility and organic matter; they are medium to strongly acid. Slow drainage in the Lee soil makes tillage impractical or impossible, except under dry conditions. The Lobelville soil has somewhat better drainage and can be cultivated under a somewhat wider moisture range. These soils are permeable to roots and moisture, but the poor drainage, especially of the Lee soil, greatly inhibits root development.

Use suitability.—Much of this acreage is still under native forest, chiefly deciduous trees. A small part is cleared and is pastured. Little is used for crops.

Without artificial drainage, these soils are too poorly drained to be suitable for crops. Areas on which drainage has been improved are well suited to moderately intensive use for row crops, chiefly to corn and to soybeans and other legumes or grasses for hay and pasture. Much of the acreage is subject to scouring if cleared. As a consequence, care is required to avoid damage by scouring. Use and management methods are discussed under group 14 in the section Use and Management of Soils.

Lee-Lobelville cherty silt loams (0 to 2 percent slopes) (Lf.).—This complex of soils is differentiated from the Lee-Lobelville silt loams chiefly by its content of chert, which is sufficient to interfere with tillage. It consists of somewhat poorly drained and poorly drained soils derived from alluvium washed from uplands underlain by cherty limestone. Like the Lee-Lobelville silt loams, these soils occupy the bottom lands of streams, the headwaters of which are in the Dickson-Lawrence soil association, but they are farther down the river than the Lee-Lobelville silt loam soils. Lee cherty silt loam occupies the lowest areas and is therefore the first to be inundated by floodwaters.

Profile description of Lobelville cherty silt loam:

0 to 14 inches, light brownish-gray to grayish-brown cherty silt loam faintly mottled with fine gray, yellow, and brown splotches; the surface 3 to 4 inches is free of mottling in places.
14 to 30 inches, light yellowish-brown, gray, yellowish-brown, and yellowish-red mottled cherty silt loam or cherty silty clay loam.
30 to 48 inches, strongly mottled light brownish-gray, yellow, and yellowish-red friable to firm cherty silty clay loam; cherty limestone or limestone bedrock occurs at 5 feet or more.

At depths of 18 to 20 inches the soil may consist virtually of chert beds in which a variable amount of clayey material is intermixed.

The areas of Lee soil have a light grayish-brown cherty silt loam surface soil that grades shortly to mottled light grayish brown, yellowish brown, and gray. The subsoil is predominantly gray cherty silt loam or cherty silty clay loam that has some yellowish mottlings. As in the areas of Lobelville soil, the subsoil may sometimes consist virtually of cherty beds intermixed with a variable amount of clayey material.

The soils of this complex are not high in fertility and organic-matter content and are medium to strongly acid. Chiefly because of the great amount of chert, they are hard to cultivate. Permeability is moderately slow, and the high water table greatly impedes root development.

Use suitability.—Much of the soil in this mapping unit is still under native forest. A larger acreage of the cherty silt loams than of the silt loams is cleared and cultivated. This is possibly because (1) the cherty silt loam may consist of cleared areas that have lost much of their silt loam as a result of scouring, and because (2) the cherty silt loam occupies positions farther down the stream valleys than the silt loam. In these positions the water table is lower and internal drainage is somewhat better. Most cleared areas have been used for crops, but only a

small part of this acreage is cultivated at the present time. The rest is pastured.

This soil is not well suited to cultivated crops. Much of the acreage, however, is fairly well suited to pasture if adequate amounts of fertilizer are used, and if the soil is properly seeded. Some of the more cherty, less well drained areas are best used for forest. Methods of use and management are discussed under group 14 in the section Use and Management of Soils.

Lickdale silt loam (0 to 2 percent slopes) (LH).—This gray poorly drained soil occupies positions around nearly level drainheads in association with the Hartsells soils. Much of it consists of shallow local alluvium washed from the adjacent areas of Hartsells soils. The total acreage is small. Most of the soil is on Keel Mountain. Some small areas, however, are mapped with the more extensive areas of Hartsells soils on the other mountains in the eastern and southern parts of the county.

Profile description:

0 to 7 inches, dark grayish-brown silt loam or loam.
7 to 19 inches, dark-gray friable clay loam or silty clay loam showing faint, fine splotches of fine yellowish red and yellowish brown.
19 to 28 inches, dark grayish-brown very firm silty clay with some yellow and red mottles.
28 to 30 inches, nearly white sand or partially weathered sandstone; sandstone bedrock is at depths of 1½ to 3 feet.

Most of this soil has a fair amount of organic matter in the surface soil. The soil is generally low in fertility and is strongly acid. It has good tilth in the surface layer and is permeable to moisture and roots. The very poor drainage, however, inhibits root development. As these areas are subject to seepage and shallow to bedrock, it would be difficult to install artificial drainage.

Use suitability.—About 20 percent of this acreage is cropped or pastured. Areas that can be drained artificially are suited to such crops as corn, soybeans, to other legumes or grasses for hay and pasture, and to some truck crops. As a rule, cleared areas are best used for pasture because the moisture is favorable for late summer and fall grazing. Use and management are discussed under group 14 in the section Use and Management of Soils.

Lindside silty clay loam (0 to 2 percent slopes) (LK).—This is a somewhat poorly drained to moderately well drained soil on first bottoms. It consists of general alluvium derived mainly from high-grade limestone. In practically all of the acreage, however, some material from sandstone, shale, and cherty limestone is intermixed. The surface is nearly level to very gently undulating.

This is one of the most extensive soils of first bottoms, and many of the separate areas are fairly large. The soil occurs along practically all of the streams of the county, except in the northwestern quarter where the Lee and Lobelville soils predominate.

Profile description:

0 to 10 inches, dark-brown to dark grayish-brown silt loam or silty clay loam; in places the lower part may be weakly mottled with gray and yellow.
10 to 20 inches, brown moderately firm silty clay loam mottled with gray and yellowish red.
20 to 30 inches +, predominantly light brownish-gray firm massive silty clay or clay mottled with brown and yellow; high-grade limestone bedrock usually at depths of more than 5 feet, but in a very few places it is at a shallower depth.

This fertile soil contains a moderate amount of organic matter. It ranges from neutral to medium acid. Tilth of the plow layer is fairly good. The slow internal drainage, however, causes the soil to be too wet for field work for a considerable time following wet periods. During much of the growing season, the soil is permeable to roots and moisture to depths of 20 to 35 inches. During the wetter periods, however, the water table is so near the surface that root development is greatly impaired. The soil has a high capacity for holding moisture available to plants. It is not subject to erosion, but overflow is a considerable hazard to crops.

Use suitability.—Practically all of this soil has been cleared. Only about 8 percent of it is used for crops, and the rest is in permanent pasture. Corn, sorghum, soybeans, and hay crops predominate. A small acreage in the better drained areas is planted to cotton. Most of these areas are drained artificially. Except for cotton, little fertilizer is used. Yields of crops generally are high. A small part of this soil is still forested.

The high fertility and smooth surface make this soil favorable for crops. Its range of suitability, however, is limited by its slow internal drainage. The soil does not warm early in the spring, and it is susceptible to floods. It is suited to intensive use, however. Among the better suited crops are corn, sorghum, and soybeans and many of the other more desirable legumes and grasses for hay and pasture. It is especially favorable for pasture and for other crops that need moisture during the drier parts of the growing season. Use and management methods are discussed under group 1 in the section Use and Management of Soils.

Linker fine sandy loam, eroded undulating phase (2 to 5 percent slopes) (LL).—This is a reddish, well-drained sandy soil. It occurs in small tracts on some of the smaller or narrower mountain ridgetops in the southeastern part of the county and is associated with the more extensive Hartsells soils. It differs from the Hartsells soils chiefly in having a reddish rather than a yellowish subsoil. Like the Hartsells soils, this soil was developed from sandstone-and-conglomerate residuum. Practically all of the soil has been eroded to the extent that the plow layer is now a mixture of original surface soil and the upper part of the subsoil.

Profile description:

0 to 5 inches, grayish-brown to light reddish-brown fine sandy loam.
5 to 12 inches, yellowish-red friable fine sandy loam, a little finer textured and firmer than the surface layer.
12 to 23 inches, yellowish-red moderately firm (friable when crushed) fine sandy clay loam that breaks to the irregular fragments characteristic of a weak medium blocky structure.
23 to 42 inches, weakly variegated yellowish-red and reddish-yellow friable fine sandy clay loam; not so firm as the layer above; partially weathered sandstone fragments are common throughout the lower few inches of this layer; sandstone or conglomerate bedrock occurs at depths of 3 to 6 feet.

The texture of the surface layer ranges from loose fine sandy loam to very fine sandy loam. Erosion has removed nearly all of the original surface soil from some areas, and the plow layer now consists of yellowish-red firm but friable fine sandy clay loam. Small quartzite pebbles are common in those areas underlain by conglomerate.

Linker fine sandy loam, eroded undulating phase, is low in fertility and content of organic matter. It is medium to strongly acid. Except in the more eroded areas, tilth of the surface layer is good. Generally the soil is friable and not difficult to work to a good seedbed.

The soil is permeable to both roots and moisture. Internal drainage is moderate to rapid, and, in general, drainage is somewhat excessive. The soil has a moderate capacity for holding moisture available to plants. Erosion is a hazard on the more sloping areas.

Use suitability.—Practically all of this soil has been used for crops at some time. Much of it is cropped at present. Because of its isolated position on narrow mountain ridges, it is not easily accessible to farm implements and fertilizer. As a consequence, most of the acreage is not farmed under a high level of management. Yields generally are not high. Corn, cotton, and lespedeza for hay are the chief crops.

The good tilth, permeability, and responsiveness to good management make this soil suitable for numerous crops. Except in the most level areas, moderately long rotations are necessary. Excess moisture drains away quickly, so the soil warms easily and is available for early planting. It is therefore especially suitable for cotton and early truck crops. Methods of use and management are discussed under group 4 in the section Use and Management of Soils.

Made land.—Areas of Made land consist of excavations and fills made chiefly for building or storage. The surface is usually smooth. The material at the surface varies from accumulations of surface soil and subsoil to exposures of deep subsurface material made by grading implements. Only a small acreage is represented on the map, but other areas were included with the soil separations in which the excavation and filling work was done. The most extensive Made land consists of the arsenal areas northwest of Huntsville. See management group 15a.

Melvin silty clay loam (0 to 2 percent slopes) (Me).—This is a gray poorly drained soil of the first bottoms. The slope seldom exceeds 1 percent. The soil consists of alluvium and is differentiated from Lee silt loam by a somewhat finer texture and by its origin from high-grade rather than cherty limestone. Practically all of this soil occupies positions on the lowest parts of the bottom lands, which are all subject to overflow from floodwaters. It is associated with the Lindside soil of the bottom lands. Where extensive stream terraces are adjacent to these bottoms, many of the areas merge with the gray poorly drained Robertsville soil of the stream terraces. Melvin silty clay loam is one of the more extensive soils of the county and occurs mainly in the southern and southwestern parts.

Profile description:

0 to 5 inches, grayish-brown to dark grayish-brown moderately friable silty clay loam.
5 to 16 inches, light brownish-gray moderately friable silty clay loam faintly mottled with gray, yellow, and brown; sticky and plastic when wet.
16 to 36 inches, light-gray moderately friable silty clay loam mottled with pale yellow, reddish yellow, and dark brown; limestone bedrock is normally at depths of 5 to 20 feet or more but may occur at considerably shallower depths along the smaller creeks.

In places the texture of the subsoil is silty clay. In some areas the entire profile is intensely mottled with gray, yellow, and brown, but usually gray predominates, especially in the upper 24 inches.

Melvin silty clay loam is a moderately fertile soil, and in most areas the content of organic matter is moderate to high. The soil ranges from slightly acid to medium acid. The surface soil has fairly good tilth but is somewhat cloddy because of its fine texture. The subsoil is slowly permeable to roots and moisture, and the water table is near the surface much of the time. Runoff water is removed slowly because surface drainage is not developed.

Use suitability.—Much of this soil is under native forest consisting of water-tolerant species, a great many of which are oaks. Other fairly common trees are cedar, holly, and swamp pine. A few magnolia trees occur. Some land has been cleared and is pastured. A small acreage is in crops, mainly corn and hay. The few areas that have been drained artificially are generally the only ones cropped.

This soil is poorly suited to tilled crops because of poor drainage and susceptibility to floods. Its high fertility, low acidity, and fine texture make it favorable for permanent pasture if drainage is adequate to remove surface water quickly. Areas that have adequate artificial drainage, are suitable for such crops as corn, sorghum, and soybeans and certain moisture-tolerant legumes and grasses. Artificial drainage of a large acreage probably would not be practical. Use and management methods are discussed under group 14 in the section Use and Management of Soils.

Monongahela fine sandy loam (0 to 4 percent slopes) (Mo).—This somewhat poorly drained light-colored soil consists of mixed alluvium derived from sandstone and shale intermixed with some limestone. Its parent material is similar to that of the Holston and Tyler soils. It is not so well drained as the Holston soil, but somewhat better drained than the Tyler. Most of this soil is nearly level.

Monongahela fine sandy loam occupies stream terraces and is associated with Holston, Tyler, Robertsville, and, in places, Colbert and Talbott soils. Most of the areas are moderately large. They are a part of smooth broad lowland landscapes, part of which is too wet to be suitable for cultivation. Much of the acreage is in the southeastern part of the county, chiefly in the Holston-Tupelo-Robertsville soil association.

Profile description:

0 to 13 inches, light yellowish-brown very friable fine sandy loam; in areas still under native forest, the upper 3 inches is grayish-brown fine sandy loam that contains a considerable amount of organic matter.
13 to 20 inches, light yellowish-brown firm fine sandy clay loam faintly mottled with gray and reddish yellow; mottling increases with depth.
20 to 40 inches, mottled light-gray, pale-yellow, yellowish-brown, and yellowish-red firm fine sandy clay loam to silty clay; limestone bedrock occurs at depths of 4 to 15 feet.

The texture of the surface layer ranges from loose fine sandy loam to heavy loam or silt loam. In places the deep subsoil is very firm silty clay.

Monongahela fine sandy loam is rather low in plant nutrients and organic matter and is medium to strongly acid. The surface layer has very good tilth under good moisture conditions. The upper part of the soil is permeable to roots and moisture. The subsoil, however, is slowly permeable, and the water table is moderately high throughout much of the growing season. Except in the more sloping areas, both internal drainage and runoff are slow. The slow internal drainage makes the soil unsuitable for many crops. The capacity for holding moisture available to plants is high. Erosion is a serious hazard only on the very small acreage where the slope is greatest.

Use suitability.—Approximately 90 percent of this soil has been cleared and is used for crops or pasture. Much

of the small acreage that is still under forest is used as woodland pasture. Corn, grain sorghum, soybeans, and common lespedeza are the chief crops grown on the cultivated acreage.

The number of suitable crops is restricted on this soil because of its impaired drainage. It is a cold soil, and field work is greatly delayed following wet periods. Among the better suited crops are corn, soybeans, grain sorghum, cotton, truck crops, and moisture-tolerant legumes and grasses. The areas in which drainage has been improved are suited to cotton and truck crops. Additional areas can be much improved for agricultural use by installing shallow ditches to remove excess runoff. This has been done in a few areas. Where drainage has been improved, the soil responds well to proper fertilization. It is productive of corn, sorghum, small grains, soybeans and most of the legumes and grasses for hay and pasture, and some truck crops. Generally, it is not suitable for alfalfa, and it is much less suitable for cotton than are some of the higher, better drained soils. Use and management are discussed under group 6 in the section Use and Management of Soils.

Muskingum fine sandy loam, hilly phase (10 to 20 percent slopes) (Mu).—Like other soils of the Muskingum series in Madison County this soil is well drained to excessively drained and shallow to bedrock sandstone. In general, it occupies positions on strong slopes along the upper reaches of drains. These drains extend into the ridgelands of mountain areas in the eastern part of the county. Areas of this soil lie above the steep stony mountain slopes and directly below the Hartsells soils that occupy the smooth parts of the ridgetops. In many respects Muskingum fine sandy loam, hilly phase, is similar to the shallow phases of the Hartsells soils. It differs from them chiefly in having hilly or stronger slopes and a somewhat shallower depth to bedrock sandstone. Although most of the Muskingum soils have a considerable amount of loose stone and some rock outcrops, this phase is for the most part free of loose stone. It is not an extensive soil.

Profile description:

0 to 5 inches, grayish-brown to light yellowish-brown loose fine sandy loam.
5 to 20 inches, light yellowish-brown friable light fine sandy clay loam that breaks to weak fragments; lower part is somewhat variegated or splotched with gray and contains partly disintegrated sandstone fragments; sandstone bedrock is at depths of 1 to 3 feet.

In those few areas that have been cultivated at some time, the surface layer is light yellowish-brown heavy fine sandy loam. A few loose stones occur on the surface in places, and there may be an occasional rock outcrop.

Muskingum fine sandy loam, hilly phase, is low in plant nutrients and organic matter. It is medium to strongly acid. The surface layer has good tilth and works easily to a good seedbed. The soil is permeable to roots and moisture, and internal drainage is rapid. Surface runoff is rapid. Seepage spots are fairly common, especially on the lower edges of the longer slopes, but are generally evident only during the wettest periods.

Use suitability.—Most of this soil is under cutover native deciduous forest. Some pine is intermixed. The areas that have been cleared at some time now have almost pure stands of pine. Practically none of the acreage is now cultivated.

This soil is poorly suited to tilled crops because of its strong slopes and shallow depth to bedrock. It affords fairly good grazing if adequate fertilizer is applied and if it is properly seeded. Most of the acreage, however, is so inaccessible that its best use is for forest. Methods of use and management are discussed under group 13 in the section Use and Management of Soils.

Muskingum stony fine sandy loam, hilly phase (10 to 20 percent slopes) (Mv).—A considerable amount of loose stones and some rock outcrops characterize this soil. It consists of residuum from sandstone and conglomerate. Practically all of it lies above the steep stony mountain slopes along the upper reaches of drains that extend into the ridgelands of the smooth mountaintops.

The 4- to 5-inch surface layer is grayish-brown to light yellowish-brown stony loose fine sandy loam. The subsoil is light yellowish-brown friable light fine sandy clay loam that contains numerous sandstone fragments throughout. Bedrock may be at the surface or at depths not exceeding 2½ feet.

This soil is low in content of plant nutrients and organic matter and is medium to strongly acid. Although it is friable and has good tilth, the rock fragments and the shallow depth to bedrock interfere greatly with tillage. Moisture and roots penetrate the soil easily. Internal drainage is medium to rapid, and runoff is rapid. The capacity for holding moisture available to plants is low because the soil is shallow.

Use suitability.—Most of this soil is under cutover native deciduous forest. Some pine is intermixed. Because of stoniness, the soil is unsuitable for tilled crops. Some areas are suitable for pasture. Much of the acreage, however, is not easily accessible and is therefore best used for forest. Methods of use and management are discussed under group 15a in the section Use and Management of Soils.

Muskingum stony fine sandy loam, steep phase (20 to 45 percent slopes) (Mw).—A stronger slope, usually a shallower depth to bedrock, and extensive loose stones and rock outcrops differentiate this soil from the hilly phase of Muskingum stony fine sandy loam. Areas of this steep phase lie above the steep stony mountain slopes. They are adjacent to and below the smoother Hartsells soils that occupy the mountain ridgetops. Much of their acreage is along the upper reaches of drainageways that extend into the smooth ridgeland areas of the mountains.

The surface 4 or 5 inches is grayish-brown or light yellowish-brown loose fine sandy loam in which a great many loose sandstone fragments are intermixed. The subsoil is light yellowish-brown friable fine sandy loam to fine sandy clay loam. Bedrock is at the surface or may be as deep as 2½ feet.

This medium to strongly acid soil is low in plant nutrients and organic matter. It is permeable to roots and moisture, and it has good tilth, but the numerous stones make tillage impractical. Both internal drainage and runoff are rapid. The capacity for holding moisture available to plants is low.

Use suitability.—Practically all of this soil is under cutover native deciduous forest; most of the small areas that were once cleared have now reverted to pine forest.

The strong slope and shallow depth to bedrock make this soil poorly suited to either crops or pasture. Consequently, practically all of it can best be used for forest. Methods of use and management are discussed under group 15a in the section Use and Management of Soils.

Ooltewah silt loam (0 to 2 percent slopes) (Op).—This is a brownish somewhat poorly drained to moderately

well drained soil. It consists of local alluvium washed from soils developed over high-grade limestone and from soils on the stream terraces derived mainly from limestone.

This soil occurs in gentle depressions in association with brown or reddish-brown well-drained soils. Some areas are in closed depressions and have no outlet for surface drainage. Others are along gentle drainageways, and a few are on very gentle valley slopes adjacent to bottom lands. The separate areas are not large. Most of them are less than 10 acres in size, but a few are from 50 to 60 acres. They are widely distributed throughout the central and southern parts of the county, especially in the Decatur-Cumberland-Abernathy, the Hermitage-Talbott-Colbert, and the Holston-Tupelo-Robertsville soil associations. Much of the acreage is temporarily flooded when wet periods are prolonged.

Profile description:

0 to 8 inches, brown to reddish-brown friable silt loam.
8 to 16 inches, brown friable silty clay loam faintly mottled with reddish yellow and yellowish gray.
16 to 36 inches, mottled yellow, gray, and brown friable to moderately firm silt loam or silty clay loam; limestone bedrock occurs at depths of more than 6 feet.

The thickness of the local or recent alluvium varies. In some places it is several feet thick, but in others firm to very firm residual silty clay occurs at depths ranging from 36 inches to 5 or 6 feet. In some places the 8- to 12-inch surface layer consists of a very recent overwash of dark-brown or reddish-brown silty material, which is underlain by predominantly gray silt loam or silty clay loam.

Ooltewah silt loam is a fertile soil. It has a fairly high content of organic matter. In most places it is medium acid, but in a few areas it is only slightly acid. Except in a very few places that have a gentle slope, internal drainage and surface runoff are slow. The surface layer has good tilth, but the slow drainage greatly delays field work after wet periods. The soil is permeable to moisture and roots. The capacity for holding moisture available to plants is high. The water table, which is within 2 or 3 feet of the surface during the moister part of the growing season, interferes with root development. However, the moderately high water table during the drier periods and the depressed position make the soil particularly favorable for crops that need much moisture late in summer and early in fall.

Use suitability.—Most of the acreage has been cleared, and much of it is drained by open ditches. Corn, soybeans, and hay are grown on nearly all of the acreage. A small part is pastured, and a very small part is still under native forest. A considerable part is planted consistently to row crops. Fairly high yields are obtained, although fertilization is not heavy. Excess moisture occasionally damages crops to some extent.

This is a productive soil that is not difficult to work and is easy to conserve. Without artificial drainage, however, most of it is a little too wet for high yields of some crops. Most areas where surface ditches have been established are productive of a number of crops, including corn, grain sorghum, soybeans, and many of the legumes and grasses for hay and pasture. The soil is not well suited to cotton and alfalfa. It is too wet to be very well suited to truck crops, although some will be productive on drained areas. This soil is especially desirable for midsummer pasture, as it retains more moisture for plants during the drier part of the growing season than many of the better drained upland soils. Use and management are discussed under group 1 in the section Use and Management of Soils.

Ooltewah fine sandy loam (0 to 2 percent slopes) (Oo).—Like Ooltewah silt loam, this soil consists of moderately well drained to somewhat poorly drained young local alluvium and colluvium. The material is more mixed in origin. In general it consists of a mixture of alluvium derived from limestone, sandstone, and, in some places, shale.

This soil occupies gentle depressions along drainageways. It is widely distributed throughout those parts of the Hermitage-Talbott-Colbert and the Holston-Tupelo-Robertsville soil associations that are not far removed from the steep, stony mountain slopes. The separate tracts are not large. Most of them are parts of smooth landscapes in which many of the soils are suitable for crops.

Profile description:

0 to 8 inches, grayish-brown to reddish-brown fine sandy loam.
8 to 16 inches, brown fine sandy loam or friable fine sandy clay loam faintly mottled with yellow and gray.
16 inches +, mottled yellow, gray, and brown material that ranges widely in texture; in some places material is fine sandy loam and in others it may be a silty clay loam or silty clay; very firm residual silty clay or clay occurs in some places at depths of 3 to 4 feet; limestone bedrock is at depths of 6 feet or more.

The texture of the surface layer ranges from loose fine sandy loam to loam. A few small areas may have a silt loam texture.

Ooltewah fine sandy loam is a moderately fertile soil. It has a small amount of organic matter and is usually medium acid. The soil has very good tilth and is permeable to roots and moisture. The high water table during much of the growing season interferes considerably with the development of plant roots.

Like Ooltewah silt loam, this is a cold soil. The periods during which it can be tilled are limited by excess moisture. Internal drainage is slow, and runoff is slow to very slow. The soil has a high capacity for holding moisture available to plants. Most areas are subject to temporary flooding during periods of excess moisture.

Use suitability.—Surface ditches have been used to drain most of this soil. Much of the acreage is now used to grow corn, soybeans, lespedeza, field peas, and grain sorghum. Some of the soil is pastured, and some of the better drained areas are planted to gardens or truck crops.

Although its natural drainage is somewhat better than that of Ooltewah silt loam, this soil is suited to only a few crops unless it is drained artificially. The primary need is removal of excess surface water. The soil is then very productive of such crops as corn, grain sorghum, soybeans, and several of the more desirable legumes and grasses for hay and pasture. It is especially desirable for row crops that require an abundant supply of moisture during the drier parts of the growing season. It is not so productive of pasture as the Ooltewah silt loam. Methods of use and management are discussed under group 1 in the section Use and Management of Soils.

Pearman loam (2 to 5 percent slopes) (Pa).—This is a moderately well drained soil of the uplands. It has a compact tight subsoil. The parent material is predominantly interbedded limestone, sandstone, and shale. This soil occupies gentle slopes and slightly depressed drainheads on low plateaus and benches on the mountain slopes and the tops of some of the lower mountains. The total area is not large. Most of this soil is on King Mountain west of Huntsville, and a few areas are south of Huntsville in the vicinity of the Red Stone Arsenal.

Profile description:

0 to 6 inches, light yellowish-brown friable loam.
6 to 15 inches, yellowish-brown firm but rather friable silty clay loam, in most places mottled with pale yellow, gray, and yellowish red.
15 to 45 inches, strongly mottled yellowish-gray, yellowish-brown, and red compact stiff very firm clay; sandstone, shale, or limestone bedrock is at depths of 2½ to 4 feet.

Drainage varies considerably. In some places the profile is free of mottling to a depth of 14 or 15 inches. In others this 14- to 15-inch layer is strongly mottled or gray to within a few inches of the surface.

Pearman loam is low in plant nutrients and organic matter. It is medium to strongly acid. The surface layer has fairly good tilth, but the subsoil is slowly permeable to moisture and roots; consequently runoff develops rapidly. Internal drainage is slow, and the capacity for holding moisture available to plants is moderate. This is a cold soil, and field work is delayed considerably following wet periods.

Use suitability.—Much of this soil has been cleared, but probably not more than 25 percent of it is now used for crops. Most of the rest is pastured. Corn, soybeans, lespedeza, and, to some extent, cotton are the chief crops. Yields are not high.

This soil can be used for tilled crops. Its low fertility, compact subsoil, slow drainage, and susceptibility to erosion make it rather poorly suited to crops. Such general farm crops as corn, sorghum, soybeans, and legumes and grasses for hay and pasture are among those better suited. Adequate fertilizer is needed for good yields. Methods of use and management are discussed under group 7 in the section Use and Management of Soils.

Pits, clay (Pc).—These are mostly small borrow pits from which soil material has been removed for fill, as for road grades and building sites. They generally have short steep sides and rather smooth floors. Their total acreage is very small. The material now exposed is not productive of plants, and some areas impound water for periods of several weeks.

Pits, gravel (Pg).—This unit consists of areas in which excavations have been made to obtain gravel. These areas in general have a very rough or broken surface and are too gravelly and sandy for plant growth. Some areas are partly covered by water and are of little value for agriculture, except possibly for trees. The total acreage is small. One of the larger areas is west of the Flint River near Brownsboro. See management group 15a.

Prader fine sandy loam (0 to 2 percent slopes) (Pr).—This is a poorly drained soil on first bottoms. It consists of young mixed alluvium, much of which was derived from sandstone and shale materials washed from the mountains. Some material derived from limestone was intermixed. This soil is distinguished from Melvin silty clay loam by its sandy texture. It occupies the lowest parts of the bottom lands along the larger creeks and rivers that rise in the mountainous part of the county. Most areas are rather small and are associated with Hamblen fine sandy loam. All areas are subject to flooding.

Profile description:

0 to 5 inches, pale-brown fine sandy loam.
5 to 10 inches, pale-brown friable fine sandy clay loam slightly mottled with pale yellow and yellowish brown.
10 to 30 inches, gray rather firm fine sandy clay loam or fine sandy clay mottled with yellow, reddish yellow, and brown; bedrock, usually limestone, occurs at depths of 4 to approximately 20 feet.

The texture of the surface layer ranges from loose fine sandy loam to heavy loam. The subsoil in many places is sandier than the soil in the surface layer. The fine sandy loam texture in some places extends throughout the profile.

Prader fine sandy loam has low to moderate fertility. The supply of organic matter in the surface layer is small. Predominantly the soil is slightly acid, but in some places it is medium acid, and in a few places it is neutral to slightly alkaline. The plow layer has good tilth. The soil to depths of 12 to 14 inches is permeable to both roots and moisture. In places, where the subsoil is sandier, the soil is permeable throughout. The development of roots is enhanced by the predominantly wet subsoil. The water table, during much of the year, is within a few feet of the surface. During the wettest seasons it is at the surface or above. Both internal drainage and runoff are very slow.

Use suitability.—About 40 percent of this soil is still under native cutover deciduous forest. The rest has been cleared or partly cleared and is usually pastured. Corn, soybeans, lespedeza, cowpeas, and sorghum are the principal crops grown on the small acreage that is cultivated. Yields are variable but generally are not high.

The poor drainage and susceptibility to floods make this soil poorly suited to tilled crops. Cleared areas support a variable amount of pasture vegetation. Unless drainage is provided, however, the pastures are not of high quality. Artificial drainage, where feasible, greatly improves this soil for both pasture and crops. The soil is suitable mainly for corn, soybeans, sorghum, and moisture-tolerant legumes and grasses for hay and pasture. Areas that are well drained and adequately fertilized are suitable for some truck crops and can be cropped intensively. Methods of use and management are discussed under group 14 in the section Use and Management of Soils.

Robertsville silt loam (0 to 2 percent slopes) (Ro).—This poorly drained gray soil on stream terraces consists of old alluvium derived mainly from limestone. It differs from Tyler very fine sandy loam in being more silty and freer of sand. Most of the areas occupy broad gentle depressions in association with Tupelo, Captina, Dunning, and Hollywood soils in the southern and southeastern parts of the county. In general, Robertsville silt loam is a part of broad smooth landscapes that consist of some soils too poorly drained for crop production and of some that are moderately well suited to well suited to crops.

Profile description:

0 to 4 inches, grayish-brown to light grayish-brown friable but heavy silt loam.
4 to 15 inches, light-gray firm silty clay loam faintly mottled with yellowish brown and brown; grades to silty clay with depth; very light gray when dry.
15 to 38 inches, gray compact very firm silty clay or clay mottled with brown, yellowish brown, and dark gray; limestone bedrock at depths of 4 to 20 feet.

In places the surface layer is silty clay loam, and in a small acreage it is silty clay.

Robertsville silt loam is a light-gray soil, low in plant nutrients and organic matter and medium to strongly acid. The surface soil usually has fairly good tilth. However, tilth is rather poor in those areas that have silty clay loam or silty clay texture. Roots and moisture penetrate the surface layer easily, but the compact subsoil

is very slowly permeable to both. Internal drainage is very slow, and runoff is slow to very slow. The capacity for holding moisture available to plants is not high. This soil is rather droughty during the drier parts of the growing season. The heavy texture and the slowness with which excess water leaves the soil cause it to be cold. Field work is delayed during wet periods.

Use suitability.—About 25 percent of the acreage has been cleared, and most of this is pastured. On the small area that is cultivated, corn is the principal crop, but some soybeans, sorghum, and lespedeza for hay are also grown. Little fertilizer is used, and, as a result, crop yields generally are low.

This soil is suitable for intensive use if adequate fertilizer and drainage are provided. Many areas cannot be drained easily and therefore are suitable only for pasture. If adequate drainage is provided, and the soil fertilized and properly seeded, a desirable type of pasture vegetation can be maintained. Otherwise, the pasture will not be of high quality.

Adequately drained and fertilized areas are productive of some crops. Among the crops best suited are corn, soybeans, sorghums, and the moisture-tolerant legumes and grasses. The soil is not well suited to truck crops and is poorly suited to such crops as cotton and alfalfa. Methods of use and management are discussed under group 14 in the section Use and Management of Soils.

Rockland, limestone, steep (Over 25 percent slopes) (Rs).—This land type occurs on steep slopes. Limestone bedrock outcrops and loose fragments of limestone are abundant on the surface. A small and variable amount of soil that is predominantly very firm silty clay or clay is intermixed with these limestone outcrops and loose fragments. This soil ranges from grayish brown to yellowish brown or reddish yellow. It is similar to the subsoil of the Colbert and Talbott soils. In general, there is not enough soil material to be cultivated or to grow pasture grass.

This steep rockland is very extensive; it occupies positions on a great part of the mountain slopes. It covers some of the lower and smaller mountains almost entirely. The higher mountains, such as those along the eastern border of the county, have a strip of Stony steep land, Muskingum soil material, above the areas of Rockland limestone, steep.

Use suitability.—Practically all of this land type is under native deciduous forest. Most of the trees are oak and hickory, but mixed stands of cedar and deciduous hardwoods predominate along the lower edge. Pines occur in a few areas, but usually they are not numerous. Most of the forest has been cut over, and sawmills are located in some of the coves to process the timber. Because of the steep slopes and sparse soil material, the only feasible use for Rockland, limestone, steep, is for forest. Use and management are discussed under group 15a in the section Use and Management of Soils.

Rockland, limestone, hilly (12 to 25 percent slopes) (Rr).—Except for its slope, this phase is similar to the steep phase of Rockland, limestone. It is characterized by a great abundance of limestone outcrops and loose fragments. A small amount of clayey residuum fills the crevasses and spaces between the rocks. Except in some small patches, however, the soil material is not sufficient to make cultivation feasible or to support enough grass for pasture.

Much of this land lies at the foot of steep mountain slopes or along their lower edge. Some of it occupies positions on the ridgetops of the lower mountains, which are capped by limestone rather than by the sandstone characteristic of the higher mountaintops. This land type is widely distributed throughout the more mountainous sections of the county. Most of it, however, is on the lower small mountains south and southeast of Huntsville.

Use suitability.—Practically all of this land type is under cutover native deciduous forest, which consists mainly of oak and hickory. On the lower lying areas, such as those at the foot of the mountains, the forest cover consists of a mixed stand of deciduous hardwoods and cedar. In places cedar is predominant. Although pines are common in some areas, they are not numerous on much of the acreage. Some beech and yellow-poplar grow in the more favorable sites.

Some areas on the lower slopes have been cleared of underbrush and are used for woodland pasture. A few small areas of Stony land, Talbott and Colbert soil material, which are included in this mapping unit, are suitable for pasture. These areas are generally so small and so isolated, however, that this use is not practical.

Because of their sparse soil and isolation, areas of this land type can best be used for forest. Use and management are discussed under group 15a in the section Use and Management of Soils.

Rockland, limestone, rolling (2 to 12 percent slopes) (Rp).—This land type is characterized by numerous limestone outcrops and loose fragments intermixed with a variable amount of clayey Talbott soil material or material that resembles Colbert soils. In most places more than 50 percent of the surface area is covered by rock outcrops and loose rock, but in a few areas there is more soil material. Usually, the surface layer has more soil material than the hilly and steep phases of Rockland, limestone.

This land type occupies positions on low limestone ridges or knolls below and separate from the mountains, or is on gently sloping benches on the mountain slopes. Some occurs on the ridgetops of the lower mountains.

Use suitability.—Most of this land is under cutover forest that is usually a mixture of deciduous hardwoods and cedar. In places the forest is nearly all cedar. A small acreage that is less stony than the rest has been cleared for pasture and supports a fair stand of volunteer vegetation. These less stony areas are fairly good for pasture, but the land as a whole is poorly suited to grazing and is not at all suitable for tillage. Practically all of it can best be used for forest. Use and management are discussed under group 15a in the section Use and Management of Soils.

Sequatchie fine sandy loam (0 to 6 percent slopes) (Se).—This is a well-drained soil on moderately old stream terraces that are predominantly sandy. It is nearly level to gently undulating. Most of the material of the Sequatchie soils was derived from sandstone, but some material from shale and limestone is intermixed. This soil differs from the Etowah soils in being much more sandy. It is somewhat browner, more sandy, more permeable, and better drained than the Holston soils. Most of this soil is in rather small tracts that are associated with Holston, Monongahela, and Etowah soils. Much of it is in the Holston-Tupelo-Robertsville soil association in the southeastern part of the county.

Profile description:

0 to 7 inches, grayish-brown friable fine sandy loam.
7 to 15 inches, reddish-brown to yellowish-red friable but somewhat firm fine sandy clay loam that becomes finer textured and a little firmer with depth; the upper part is approximately fine sandy loam.
15 to 20 inches, yellowish-red or reddish-brown friable but moderately firm fine sandy clay loam; weak to moderate medium blocky structure.
25 to 45 inches, yellowish-red friable fine sandy clay loam faintly mottled with reddish brown and brownish yellow; layer a little looser and sandier than the layer above; limestone bedrock is at depths of 5 to 20 feet.

The texture of the surface layer ranges from loose fine sandy loam to heavy loam. The subsoil in some of the smoother areas is yellowish brown to strong brown.

Sequatchie fine sandy loam is moderately fertile and has a moderate amount of organic matter in the surface layer. It is medium to strongly acid. The plow layer has very good tilth and works easily to a fine seedbed. The soil is permeable to roots and moisture. The water table is at a depth of several feet during much of the growing season. Internal drainage is medium to a depth of 3 feet. In some of the lower lying areas, however, drainage may be somewhat retarded at that depth. Surface runoff is slow, and very little of the soil is subject to damage by erosion. The soil has a moderate capacity for holding moisture available to plants. Because of its permeability and moderately low position, it has a fairly good supply of moisture throughout much of the growing season.

Use suitability.—Practically all of this soil is used for general farm crops. Cotton, corn, soybeans, potatoes, peanuts, and sorghum are the most common crops. Row crops are predominant in the rotations. Moderately high yields are usually obtained. Some fertilizer is used.

This soil is one of the most desirable for agricultural use because of its smooth surface, good tilth, and favorable moisture. It is responsive to good management and is suited to a wide variety of crops and to fairly intensive use. Among the crops that yield well if well managed are cotton, corn, alfalfa, small grains, soybeans, sorghum, and a wide variety of truck crops, including potatoes, tomatoes, cabbage, and beans. If the soil is properly fertilized and seeded, it is productive of a number of legumes and grasses for hay and pasture. Methods of use and management are discussed under group 2 in the section Use and Management of Soils.

Sequatchie fine sandy loam, eroded phase (2 to 6 percent slopes) (SF).—This eroded soil has a 4- to 5-inch plow layer that ranges from grayish-brown fine sandy loam in less eroded areas to yellowish-red firm fine sandy loam or fine sandy clay loam in the most eroded areas. The subsoil is predominantly yellowish-red or reddish-brown friable but firm fine sandy clay loam. Limestone bedrock occurs at depths of 4 to 20 feet.

This is a moderately fertile soil, but the content of organic matter is not high. The soil is medium to strongly acid. Tilth of the plow layer in most places is very good, but in the more eroded areas the soil is a little cloddy. The soil is permeable to roots and moisture. Internal drainage is medium to rapid. The capacity for holding moisture available to plants is moderate. Although this soil has been affected somewhat by erosion, runoff is not difficult to control.

Use suitability.—Practically all of this soil is used for crops, mainly cotton and corn. The smooth surface, good tilth, permeability, and favorable moisture make this one of the more desirable soils of the county for crops and pasture. It responds well to proper management and is suited to numerous crops, including cotton, corn, small grains, alfalfa and a number of legumes and grasses for hay and pasture, and many truck crops. Use and management are discussed under group 2 in the section Use and Management of Soils.

Stony colluvium, Jefferson and Colbert soil materials (0 to 3 percent slopes) (ST).—This land type consists of rock fragments, cobbles, and soil material that have been washed from adjacent steep slopes and deposited in narrow draws as colluvium and local alluvium. The rock fragments are mixed sandstone and limestone cobbles and boulders. The soil material ranges from sandy wash from Hartsells and Muskingum soils to clayey material from the Rockland, limestone, areas and from the Talbott and Colbert soils. All of this land type occupies narrow strips along streams or along drains that extend into the steep mountain areas.

Use suitability.—Much of this land has been cleared. A great part of it is in unimproved pasture, although some of the least stony areas are cultivated. The chief crops are corn, soybeans, and sorghum for sirup. Some acreage is in home gardens. Crop yields in general are good, but the areas are difficult to till because of the great amount of cobbles and rock fragments. The pastured areas produce a good volunteer stand of grasses and legumes, and good pasture can be developed.

On the whole, this land type is too stony for cultivation. Much of the acreage, however, has enough fertility and moisture to grow the more desirable legumes and grasses for pasture. Use and management are discussed under group 15 in the section Use and Management of Soils.

Stony rolling land, Talbott and Colbert soil materials (6 to 12 percent slopes) (SV).—This land type consists of numerous limestone outcrops that have enough soil material intermixed to support some pasture vegetation. Much of this acreage lies in narrow strips along the lower edge of steep stony mountain slopes. Most of it is in the eastern part of the county, south and southeast of Huntsville. A few small areas occur on the ridgetops of low mountains that are capped with limestone.

The soil material is yellow or yellowish-brown to reddish-yellow very firm plastic clay. Below depths of 4 to 5 inches it is usually mottled. Practically all areas are shallow to bedrock, which may outcrop or be at depths not exceeding 2 feet.

In a few of the less stony areas, the soil has been in place long enough to develop a profile. In these areas, it resembles either the Colbert or Talbott soils. The surface 3 to 4 inches is light yellowish-brown to brown heavy silt loam or silty clay loam. The subsoil is very firm yellowish-brown or yellowish-red clay. Mottling occurs at depths of 12 to 14 inches.

The soil material is medium acid to neutral and is moderately fertile. The plow layer has good tilth. The soil is slowly permeable to roots and moisture. Internal drainage is slow, but runoff is moderately rapid because of the slow infiltration of moisture and the moderately strong slopes.

Use suitability.—A large part of this land type is under cutover forest, much of which is cedar. Other trees that are not so common are oak, hickory, hackberry, and redbud. Some acreage is cleared or partly cleared and is in permanent pasture. A very few small less stony tracts have been cleared and are cropped. Corn, potatoes,

and other crops for home use are grown on these tracts. Practically all the field work is done by hand because the many stones prevent the use of farm equipment. Much of this land type, especially the less stony areas, will produce good stands of the more desirable legumes and grasses for pasture if it is cleared and fertilized. Use and management are discussed under group 15 in the section Use and Management of Soils.

Stony smooth land, Talbott and Colbert soil materials (2 to 6 percent slopes) (Su).—This land type differs from the associated Stony rolling land, Talbott and Colbert soil materials, mainly in having a smoother surface. It occupies positions at the base of steep stony mountain slopes in the eastern and southeastern parts of the county.

Use suitability.—Most of this land is in wooded pasture. A small part, which has been cleared completely, may be used for subsistence crops. As a rule, areas that have been cleared develop a volunteer stand of legumes and grasses. Such stands can be improved by fertilizer and supplementary seeding. Use and management are discussed under group 15 in the section Use and Management of Soils.

Stony steep land, Muskingum soil material (10 to 45+ percent slopes) (Sw).—This land type consists of sandstone outcrops, escarpments, and boulders, intermixed with sandy soil material. Most areas are on the outcrop of the Pottsville geologic formation. They occur as irregular strips above the broad belt of Rockland, limestone, steep, and below the undulating and rolling ridgetops of the mountains. Generally the upper part of these strips consists of strongly sloping to precipitous sandstone outcrops. The lower part consists of sandstone fragments that range from small stones to boulders many feet in diameter. The intermixed sandy soil material has sloughed from smoother ridgetop areas.

A few areas are outcrops of the thinner Hartselle sandstone geologic formation. These occur as narrow benches on the mountain slopes and on the tops or crests of some of the lower mountains, such as Capshaw and Rainbow Mountains.

Use suitability.—Practically all of this land type is under cutover native forest. The cover on the more exposed escarpments is sparse and stunted. The chief vegetation on these areas is scrub oak, pine, and some cedar, shrubs, and briers. On the colluvial material of the lower part of these areas, the forest cover consists of larger trees, which are mainly oak and hickory. Some gum, elm, poplar, ash, hackberry, beech, and black walnut are intermixed. Practically all of this forest has been cutover, and the present stand consists of small trees.

This land is of no value for crops and is of very little value for pasture. It is suitable only for forest, but forest growth is slow, and practically all of the areas are difficult to reach even for removing timber. For a discussion of use and management, see group 15a in the section Use and Management of Soils.

Taft silt loam (0 to 2 percent slopes) (Ta).—This somewhat poorly drained, nearly level soil consists of mixed alluvium derived mainly from limestone. It occurs on moderately low stream terraces along the larger streams, mainly along the Flint River. It is also on the broad lowland in the southeastern part of the county near Owens Crossroads and New Hope.

This soil is differentiated from Tupelo silt loam principally by a less plastic, less compact subsoil. It is somewhat better drained than Robertsville silt loam, but it is somewhat more poorly drained than the associated Humphreys and Etowah soils. Most of it lies at slightly lower elevations than the Humphreys and Etowah soils.

Profile description:

0 to 6 inches, light yellowish-brown friable silt loam.
6 to 20 inches, predominantly brownish-yellow mellow friable silt loam weakly mottled with yellow and gray, especially in the lower part of the layer.
20 to 38 inches, strongly mottled gray, yellow, and brown firm silty clay loam; limestone bedrock at 4 to 20 feet.

The texture of the surface layer in some places is silty clay loam. In some areas, the subsoil is firm to very firm silty clay, which resembles the subsoil of Tupelo silt loam. Small dark iron concretions occur throughout the profile in a great many areas, especially in the subsoil.

Taft silt loam is moderately fertile, but its content of organic matter is low. It is medium to strongly acid. The plow layer has moderately good tilth and is permeable to moisture and roots. The subsoil, however, is slowly permeable, and the relatively high water table inhibits root penetration. Both internal drainage and runoff are slow. During the wettest seasons the water table is at the surface or very near it. During the driest parts of the year, it is at depths of 3 to 4 feet.

Use suitability.—About 60 percent of this soil has been cleared and improved for crops. Probably a fourth of it has now been abandoned for crop use and is in permanent pasture. Approximately 40 percent of the acreage is under cutover native deciduous forest. The most common crops are corn, soybeans, cowpeas, lespedeza, and grain sorghum. For some of the acreage, drainage has been improved by installing shallow surface ditches. Cotton is grown on some of the better drained areas. Some fertilizer is used, especially for row crops.

This soil is suitable for cultivated crops but it is limited by its inadequate drainage. It is fairly productive of corn, soybeans, and such hay and pasture crops as lespedeza, redtop, and fescues. Adequate artificial drainage will greatly improve the productivity and range of suitability of this soil. Much of the acreage, if adequately fertilized and limed, will support good pasture. Such pasture is especially valuable during the drier parts of the growing season when pasture vegetation on the higher, better drained soils is dormant. Use and management are discussed under group 6 in the section Use and Management of Soils.

Talbott silty clay loam, eroded undulating phase (2 to 6 percent slopes) (Tg).—Like other Talbott soils, this is a reddish clayey soil developed over clayey limestone. Its surface soil and upper subsoil resemble those of the Dewey soils; however, the main part of the subsoil is more plastic and clayey, and the depth to bedrock is less. Much of the acreage of Talbott soils is on gentle valley inclines at the base of mountain slopes. These soils are a part of landscapes that are largely suitable for cultivation.

Practically all of this phase of Talbott silty clay loam is eroded, and the plow layer now consists of a mixture of surface soil and subsoil. This phase occurs in association with the stony lands (Talbott and Colbert soil materials) and Colbert and Hermitage soils in the Hermitage-Talbott-Colbert and the Holston-Tupelo-Robertsville soil associations.

Profile description:

0 to 5 inches, brown to light reddish-brown firm silty clay loam.
5 to 15 inches, reddish-brown to yellowish-red very firm silty clay loam that grades to silty clay; weak to moderate fine blocky structure.
15 to 28 inches, yellowish-red very firm silty clay faintly mottled with brown and reddish yellow; moderate fine blocky structure.
28 to 42 inches, mottled yellowish-brown, pale-yellow, pale-brown, and reddish-brown very firm silty clay; clayey limestone bedrock is at depths of 2 to 6 feet.

In the less eroded areas the surface layer is 6 to 7 inches thick and consists of brown silt loam. In contrast, some severely eroded areas have lost all of the original surface soil and have a plow layer that consists of yellowish-red very firm silty clay. There are a few rock outcrops. Chert fragments occur in some areas but are not numerous enough to interfere materially with cultivation.

The supply of plant nutrients and organic matter is moderate, and the soil is medium to strongly acid. In the less eroded areas the surface soil has fairly good tilth, but in most places the tilth is somewhat poor because the soil is clayey. The soil should not be cultivated if too wet, and it breaks to hard clods if worked too dry. The surface soil is moderately permeable to moisture and roots, but the subsoil is slowly permeable. Internal drainage is slow. The capacity for holding moisture available to plants is somewhat limited by the high clay content. The soil is easily eroded, especially in the more sloping areas, because infiltration of moisture is slow.

Use suitability.—Much of this soil is used for crops at the present time. Cotton was once grown almost exclusively. It is still the predominant crop, but some soybeans, grain sorghum, winter oats and other small grains, lespedeza, and corn are also grown. Cotton usually receives moderate to heavy applications of mixed fertilizer. Where winter small grains follow cotton that has been well fertilized, no additional fertilizer is applied. Nevertheless, a nitrate fertilizer is usually applied in spring for the small grains. Corn that follows winter legumes on well-fertilized ground seldom receives additional fertilizer.

This soil is well suited to crops and pasture, but its suitability is limited by slow permeability, somewhat unfavorable tilth, and narrow range of moisture content satisfactory for tillage. It requires moderately long rotations and careful control of runoff water. It is suitable for the crops most commonly grown, except truck crops. It is especially unsuitable for potatoes and other root crops that need a friable permeable plow layer. Small grains and a wide variety of legumes and grasses, including alfalfa, are among the better suited crops. The limited moisture supply decreases the suitability of this soil for midsummer pasture and other crops that need a good supply of moisture late in the growing season. Use and management are discussed under group 7 in the section Use and Management of Soils.

Talbott silty clay loam, eroded rolling phase (6 to 12 percent slopes) (TH).—This soil is closely associated with other Talbott and with Colbert soils. Most of it is in the Hermitage-Talbott-Colbert soil association. It is not an extensive soil, and most of the individual areas are small.

Approximately two-thirds of the acreage has lost all of the original surface soil through erosion. In such areas the plow layer consists of yellowish-red very firm silty clay. The plow layer on the remaining acreage consists of a mixture of the original surface soil and subsoil and is predominantly reddish-brown silty clay loam. At a depth of about 14 inches, the soil is mottled yellow, red, and gray very firm silty clay. Clayey limestone bedrock is at depths of 1½ to 5 feet. A few gullies occur in the more eroded areas. Most of these are shallow, but some may be large enough to require considerable filling. Limestone outcrops are common, especially on the more sloping acreage.

This is a moderately fertile soil, but its content of organic matter is low. It is medium to strongly acid. The plow layer has poor tilth. The soil, on the whole, is slowly permeable to moisture and roots. Internal drainage is slow and runoff is rapid. The capacity for holding moisture available to plants is low, and the soil is therefore droughty.

Use suitability.—All of this soil has been cropped at some time. Now, much of it has reverted to unimproved pasture or has been reforested by natural seeding. The tilled acreage is used principally for cotton and corn, but yields are usually low.

This soil has greatly limited suitability for crops because of its unfavorable tilth and low moisture supply. It requires long rotations that consist chiefly of close-growing small grains, and grasses and legumes for pasture and hay. Its principal needs are adequate control of runoff, increased fertility, and improvement of tilth by adding organic matter. Use and management are discussed under group 10 in the section Use and Management of Soils.

Talbott cherty silty clay loam, eroded undulating phase (2 to 6 percent slopes) (TB).—This soil was derived from cherty, clayey limestone. Practically all of it is in the limestone valleys, where it lies on strips adjacent to and directly below the stony rough mountain slopes. The soil is gently undulating. Nearly all of the acreage is a part of more extensive smooth areas, most of which are suitable for cultivation. This soil is associated with other Talbott and with Colbert soils. It is widely distributed throughout the Hermitage-Talbott-Colbert and the Holston-Tupelo-Robertsville soil associations.

Profile description:

0 to 5 inches, pale-brown to light reddish-brown friable to firm cherty silty clay loam.
5 to 25 inches, reddish-brown to reddish-yellow very firm cherty silty clay; faint mottlings of yellow, gray, and brown are common, especially in the lower half of the layer.
25 to 40 inches, strongly mottled yellowish-red, reddish-brown, and dark yellowish-brown cherty very firm or tight silty clay or clay; bedrock at depths of 2 to 6 feet.

Some patches have lost practically all of the surface soil through erosion. In these the plow layer consists of the yellowish-red or reddish-yellow, tight, very firm cherty silty clay subsoil. The amount of chert fragments varies. In some places they interfere but little with cultivation, but in others they are numerous enough to interfere greatly. The chert fragments in some areas are large; they reach a maximum of 8 to 10 inches in diameter.

Talbott cherty silty clay loam, eroded undulating phase, is moderately fertile and has some organic matter in the less eroded areas. It is medium to strongly acid. Except in the more eroded areas, where tillage is very difficult because of the high clay content, tilth of the surface layer is fair. This soil is slowly permeable to both roots and moisture. Internal drainage is slow. The capacity for holding moisture available to plants is low, and the soil on the whole is rather droughty during the driest parts of the growing season.

Use suitability.—Practically all of this soil has been cropped at some time. Corn and cotton are the chief crops, but some lespedeza and soybeans are grown for hay.

Although the soil is fairly well suited to tilled crops, the high chert content greatly interferes with field work, especially with tillage and mowing. The slow permeability causes runoff to develop quickly on the more sloping areas, and moderately long rotations are required to control it. Among the more general farm crops for which the soil is suited are cotton, small grains, and alfalfa and other legumes and grasses for hay and pasture. This soil is not well suited to truck crops because it has poor tilth and a firm subsoil. Productivity of crops that need moisture during the driest parts of the growing season is restricted. Methods of management are discussed under group 7 in the section Use and Management of Soils.

Talbott cherty silty clay loam, eroded rolling phase (6 to 12 percent slopes) (Tc).—This soil is widely distributed throughout the Hermitage-Talbott-Colbert soil association. Practically all areas in this association occur on very gentle valley slopes directly below the stony steep mountain slopes. Some areas are in the Holston-Tupelo-Robertsville soil association in the southeastern part of the county.

Practically all of this phase is so eroded that the plow layer now consists of a mixture of surface soil and subsoil material. The 4- to 5-inch surface layer is predominantly reddish-brown cherty silty clay loam. The subsoil is yellowish-red very firm cherty silty clay. At 14 to 16 inches it grades to mottled red, yellow, and gray very firm cherty silty clay. Limestone bedrock occurs at depths of 1½ to 5 feet.

Some patches on the stronger slopes are so eroded that all of the original surface soil has been lost. In these patches the plow layer now consists of the reddish-yellow very firm cherty silty clay subsoil material. Shallow gullies are common in these areas, but usually they can be eliminated by use of heavy machinery. The content of chert varies. In some places the soil is difficult to till because of the chert on the surface, but in others, the soil is easy to till. Limestone outcrops occur in a few places.

Talbott cherty silty clay loam, eroded rolling phase, has a moderate supply of plant nutrients and organic matter and is medium to strongly acid. The surface soil in the less eroded areas has fair tilth. The severely eroded areas have very poor tilth because the plow layer is clayey. The soil is slowly permeable to roots and moisture. Internal drainage is slow. The capacity for holding moisture available to plants is low. The soil is therefore droughty during the drier parts of the growing season. Although chert fragments interfere with field work, they slow runoff and aid infiltration of moisture. Thus, the tilled areas are somewhat less subject to erosion than tilled areas of the less cherty Talbott soils.

Use suitability.—Practically all of this soil has been cropped at some time. At present many of the more severely eroded areas are in permanent pasture or reestablished forest. Much of the rest is cropped, although parts are cultivated only at irregular intervals. Corn, cotton, and lespedeza and certain other legumes and grasses for hay are the chief crops. Some fertilizer is used for row crops, but little effort has been made to improve pastures.

Chert content, slow permeability, poor tilth, and moderately strong slope greatly limit the usefulness of this soil for crop production. At least moderately long rotations are necessary. Among the better suited crops are cotton, small grains, and most of the more desirable legumes and grasses for hay and pasture, including alfalfa. This soil is poorly suited to most truck crops. Its productivity for pasture is especially restricted during the drier parts of the growing season because reserve moisture is lacking. Use and management are discussed under group 10 in the section Use and Management of Soils.

Talbott cherty silty clay, severely eroded rolling phase (6 to 12 percent slopes) (Td).—Much of this soil is on valley slopes directly below steeper mountain areas. The separate tracts are small and are intricately associated with less eroded Talbott soils. Most of the soil occurs in the Hermitage-Talbott-Colbert soil association.

The plow layer consists almost entirely of yellowish-red to reddish-brown very firm cherty silty clay or clay. To a depth of about 10 inches, the subsoil is similar to the plow layer. The underlying material is mottled red, yellow, and gray very firm cherty clay. Limestone bedrock is at depths of 1 to 4 feet.

Some limestone outcrops are on the more strongly sloping areas. Some gullies occur. They are usually small and shallow, but a few may be difficult to fill. The chert content varies. In some areas it is so abundant as to make tillage very difficult or impractical, but in others it interferes little with cultivation.

The soil is low in plant nutrients and organic matter. It is medium to strongly acid. It has good tilth in the plow layer but can be worked only within a very narrow moisture range. If too wet when cultivated, the soil forms a plastic mass; if too dry, it breaks into hard clods that are difficult to work to a good seedbed. The soil is slowly permeable to both roots and moisture. It has a very low capacity for holding moisture available to plants. Internal drainage is slow. The rather strong slope and slow permeability make this soil subject to erosion if cultivated.

Use suitability.—All of this soil has been cultivated at some time. Much of it now has been abandoned for crop use and is either in unimproved pasture or has reverted to forest. Corn, cotton, and lespedeza are the chief crops grown in the cultivated areas. Yields in general are low.

The very unfavorable tilth, low capacity for holding moisture available to plants, and slow permeability make this soil very poorly suited to tilled crops. If adequately fertilized and seeded, it has some value for pasture. During dry periods, however, pasture growth is retarded by the low moisture supply. Consequently, much of the acreage is best used for forest. Methods of use and management are discussed under group 12 in the section Use and Management of Soils.

Talbott fine sandy loam, eroded undulating phase (2 to 6 percent slopes) (Te).—This phase consists of areas of Talbott soils that have a thin sandy alluvial deposit on the surface. Most areas are small, and practically all of them are in the southeastern part of the county in the Holston-Tupelo-Robertsville soil association.

The 4- to 6-inch surface layer is light-brown to light reddish-brown friable fine sandy loam. At depths of 6 to 9 inches is the subsoil, a reddish-brown to yellowish-red fine sandy loam to friable fine sandy clay loam. At 9 to 30 inches is yellowish-red very firm plastic silty clay or clay. Below 30 inches, the soil is very firm silty clay or clay strongly mottled with yellowish red, gray, and brown. Limestone bedrock is at depths of 2 to 6 feet.

The thickness of the sandy surface layer reaches a maximum of about 12 inches in places. A few areas are so eroded that the plow layer now consists of a mixture

of the sandy material and the clayey subsoil. Gravel or cobbles occur in some areas; most of these areas are represented on the soil map by symbol.

Talbott fine sandy loam, eroded undulating phase, is moderately fertile and has some organic matter in the surface layer. It is medium to strongly acid. The sandy layer has good tilth and is permeable to roots and moisture. The underlying clayey material, however, is slowly permeable and retards internal drainage. The capacity for holding moisture available to plants is moderate.

Use suitability.—All of this soil has been cleared. Much of it is cropped at the present time, and a small part is pastured. Corn, cotton, and hay are the chief crops. Some acreage is in small grains, grain sorghum, sweet sorghum, and a few truck crops. The soil is fairly desirable for crops. It is generally suited to practically all of the crops grown in the county, including alfalfa and truck crops. Areas that are shallow to clayey material, however, or in which the clayey material is part of the plow layer, are not well suited to truck crops.

The soil responds well to good management. It can be used in a moderately short rotation if care is taken to restrain runoff. Because of the slowly permeable subsoil, the moisture supply is somewhat less favorable than that of some of the more permeable well-drained soils. Use and management are discussed under group 7 in the section Use and Management of Soils.

Talbott fine sandy loam, eroded rolling phase (6 to 12 percent slopes) (TF).—Probably one-fourth of this soil has been severely eroded. Most of the soil occurs in the southeastern part of the county.

In severely eroded areas, the plow layer is predominantly very firm clay intermixed with some sand. The subsoil is yellowish-red very firm clay, mottled below a depth of about 15 inches. Limestone bedrock is at depths of 1½ to 5 feet. A few rock outcrops occur, and there may be some shallow gullies in the more exposed, severely eroded patches.

The supply of plant nutrients and organic matter is somewhat lower in this soil than in the eroded undulating phase of Talbott fine sandy loam. The soil is medium to strongly acid. Tilth varies according to the degree of erosion. Where much of the fine sandy loam remains, tilth is good. In areas where practically all of it has been lost, the tilth is very poor because of the clayey plow layer. The sandy soil material is permeable, but the underlying clayey subsoil is slowly permeable to both roots and moisture. Internal drainage is slow. The capacity for holding moisture available to plants varies according to the depth to the heavy subsoil. Generally the capacity is moderately low, but in the most severely eroded parts it is very low.

Use suitability.—Because of its slow permeability and rather low capacity for holding moisture available to plants, this soil is limited chiefly to sorghum, small grains, soybeans, and legumes and grasses for hay and pasture. Its small supply of moisture during the drier parts of the growing season greatly lowers its value as pasture. Methods of use and management are discussed under group 10 in the section Use and Management of Soils.

Talbott-Colbert cherty silty clay loams, eroded hilly phases (12 to 25 percent slopes) (TK).—This mapping unit is a complex of strongly sloping Talbott and Colbert soils. These two hilly phases are so intermixed and so gradational that it was not practical to separate them on the map. Most of the areas occur as narrow strips at the base of stony steep mountain slopes. They lie just above the smoother undulating and rolling Talbott and Colbert soils and associated soils of the limestone valleys.

Nearly all of the acreage is so eroded that the plow layer consists of a mixture of surface soil and subsoil materials. Consequently, the 4- to 5-inch plow layer is now yellowish-red to yellowish-brown silty clay loam intermixed in most places with sufficient chert to hinder tillage. The subsoil is yellowish-red, reddish-brown, or yellowish-brown very firm cherty silty clay. It grades to mottled very firm cherty silty clay at depths of 12 to 18 inches. Limestone bedrock is at depths of ½ to 3 feet.

Limestone outcrops, although fairly common, do not make tillage impractical. Some patches in the more exposed areas are so severely eroded that the plow layer now consists of yellowish-red or yellowish-brown very firm cherty silty clay. Shallow gullies are common in these areas; some of them may be too deep to obliterate by using the usual farm machinery.

The soils of this complex are not high in fertility, and their content of organic matter is low. They are medium to strongly acid. Generally, tilth is rather poor because of the clay texture of the soils. These soils are slowly permeable to roots and moisture, and internal drainage is slow. The rapid runoff is very erosive when the soils are cultivated.

Use suitability.—Practically all of this complex of soils has been cleared at some time. Only about 30 percent of it is now used for crops, mainly corn, cotton, soybeans, and cowpeas. Yields of all crops are rather low, and, except for cotton, little or no fertilizer is used. Some of the land has reverted to forest. Much of it is in unimproved pasture in which volunteer lespedeza and Dallisgrass usually predominate.

The strong slopes, low moisture supply, and slow permeability of the subsoils make the soils of this complex poorly suited to crops that require tillage. As pasture, the land will afford a considerable amount of grazing during the moister periods of the growing season, and much of the acreage can be improved for this purpose. Use and management are discussed under group 13 in the section Use and Management of Soils.

Tupelo silt loam (0 to 2 percent slopes) (TU).—This light-colored, somewhat poorly drained soil is distinguished from Taft silt loam by its very firm plastic clayey subsoil. It consists of fine-textured general alluvium derived mainly from clayey residuum that originated from clayey limestone.

This soil occurs on low stream terraces. Much of the acreage is in the southeastern part of the county in the Holston-Tupelo-Robertsville soil association. Other areas are in the south-central part of the county. Many individual areas are fairly large. They are part of smooth landscapes that consist of poorly drained soils, as well as of a considerable acreage of soils sufficiently well drained to be fairly well suited to crops.

Profile description:

0 to 5 inches, light-gray to pale-brown heavy silt loam that crushes easily to a soft mellow mass.

5 to 12 inches, faintly mottled pale yellowish-gray, yellowish-brown, and reddish-yellow silty clay loam that grades with depth to firm or very firm silty clay.

12 to 26 inches, strongly mottled yellowish-brown, yellowish-gray, and reddish-brown very firm silty clay or clay that breaks fairly easily to angular fragments; limestone bedrock usually at depths of 5 to 7 feet, although in many places it is much shallower; an occasional rock outcrop may occur.

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A variable amount of small, hard, dark concretions occur throughout the soil, especially in the subsoil. In many areas a considerable number are on the surface.

The content of plant nutrients and organic matter is rather low, and the soil is medium to strongly acid. The surface layer has fairly good tilth, but the subsoil is very slowly permeable to both roots and moisture. Internal drainage is slow, and surface runoff is moderately slow to slow. During the wetter parts of the year the water table is sometimes less than a foot from the surface. During the drier seasons, it is at a depth of several feet. The soil has a moderate capacity for holding moisture available to plants and is not droughty. In practically all of it drainage is inadequate for the more exacting crops. On the whole, the soil is cold. Field work is greatly delayed following wet periods.

Use suitability.—Approximately 80 percent of this soil has been cropped at some time. About half of it is cultivated at the present time. The rest of the cleared acreage is in pasture some of which has been fertilized and seeded. Most of the uncleared land is in woodland pasture, which has a much lower carrying capacity than the improved pasture. Corn, soybeans, sorghum, moisture-tolerant legumes, and grasses for hay are the predominant crops. In some areas the drainage has been improved by shallow surface ditches. These are more productive than the unimproved areas. A small acreage of cotton is grown on the better drained areas.

The impaired drainage and heavy subsoil limit the crops that can be grown on this soil. Among those for which it is most suitable are small grains, grain sorghum, corn, and soybeans, and such hay and pasture crops as lespedeza, redtop, fescues, Ladino clover and red clover. The more adequately drained areas are suitable for cotton, but the soil is generally not suited to alfalfa or to potatoes, beans, and most other truck crops. This soil can be used intensively, however, for those crops adapted to it. It responds well to adequate fertilization. Care is required to maintain good tilth. Use and management are discussed under group 6 in the section Use and Management of Soils.

Tupelo silt loam, overwash phase (0 to 2 percent slopes) (Tv).—This phase consists of areas of Tupelo silt loam on which a thin layer of young local alluvium from higher lying adjacent soils has been deposited. Most of it occurs in the southeastern part of the county in the Holston-Tupelo-Robertsville soil association.

The recent alluvial layer is from 3 to 6 inches thick. It is distinguished from the normal Tupelo silt loam surface soil by a more friable consistence and a sandier texture. It ranges in color from brown to light gray and in texture from light loam to silt loam. The underlying material is light-gray to pale-brown heavy silt loam that grades to faintly mottled pale yellowish-gray, yellowish-brown, and reddish-yellow firm silty clay or clay. Below about 20 inches, the soil is mottled yellowish-brown, yellowish-gray, and slightly reddish-brown very firm silty clay or clay. Depth to limestone bedrock ranges from 5 to 7 feet.

This soil is moderately fertile, and its content of organic matter is small. It is medium to strongly acid. The recent alluvial overwash layer is friable and permeable. In this respect the overwash has improved the soil for plants. The subsoil is slowly permeable to roots and moisture. Internal drainage is slow, although it is somewhat better than that of the normal Tupelo silt loam. Runoff is slow to very slow, and the capacity for holding moisture available to plants is moderately high. Because of its capacity for storing moisture and its slow drainage, this soil has more moisture during the drier parts of the growing season than many of the well-drained, higher lying soils.

Use suitability.—Much of this soil is used for crops. Corn, cotton, small grains, and soybeans and legumes and grasses for hay and pasture predominate. The yields are higher than on Tupelo silt loam, as drainage is somewhat more favorable.

This soil is suited to a fairly large number of crops including cotton, corn, sorghums, small grains, soybeans, and most of the commonly grown legumes and grasses. Although internal drainage is greatly impaired, drainage in general is better than in Tupelo silt loam. Therefore, more of the acreage is suitable for cotton. Except where the overwash layer is 8 to 10 inches thick, this soil is not well suited to most truck crops. Like Tupelo silt loam, it is suitable for crops and pasture plants that need a good moisture supply during the drier parts of the growing season. Use and management are discussed under group 6 in the section Use and Management of Soils.

Tyler very fine sandy loam (0 to 2 percent slopes) (Ty).—This is a poorly drained, nearly level, gray soil that occupies low gentle depressions on old stream terraces. It consists of a mixture of materials derived from sandstone, shale, and limestone. It has parent material similar to that of the Monongahela and Holston soils but it differs from those soils in being poorly drained and grayer in color. Much of the soil is in the southeastern part of the county, chiefly in the Holston-Tupelo-Robertsville soil association. Although this soil is not well suited to cultivation, it is a part of broad smooth landscapes that have a large acreage suited to crop production.

Profile description:

0 to 8 inches, pale-brown grading to light-gray, friable very fine sandy loam; in some areas the lower part is faintly mottled with brown and yellowish brown.
8 to 30 inches, light-gray, mottled with reddish yellow and yellowish red, firm fine sandy clay loam; grades to very firm clay that is sticky and plastic when wet; limestone bedrock at depths of 4 to 20 feet.

The thickness of the friable very fine sandy loam ranges from 6 to 12 inches. In some places the underlying subsoil is somewhat more friable than that described in the profile above.

Tyler very fine sandy loam is low in content of plant nutrients and organic matter and is strongly acid. The surface soil has good tilth and is permeable to moisture and roots. The permeability of the subsoil, however, ranges from very slow in most areas to moderate in a few.

During wet periods, especially in winter, the water table is at the surface or a little above it. During the drier parts of the growing season, the water table is well below the surface and the soil may be somewhat droughty. The high water table during the early part of the growing season inhibits root development. The resulting shallow root systems cause the plants to be susceptible to drought. The capacity of the soil for holding moisture available to plants, however, is fairly high. It is adequate for a number of crops if artificial drainage is provided so that plant roots will grow to average depth.

Use suitability.—Approximately half of this soil is under native deciduous forest. Much of the cleared acreage is in corn, soybeans, and grain sorghum. A small acreage in the better drained areas is in cotton. Some partly cleared land is pastured, and part of the woodland is grazed. Little pasture has been improved by fertilizer,

lime, or seeding. If artificial drainage is adequate, yields of crops, including cotton, are fairly good.

The very slow runoff, slow internal drainage, and low fertility make this soil poorly suited to cultivated crops. Some areas that have better natural drainage produce fairly good pasture, but in general a rather poor type of vegetation prevails. Artificial drainage greatly improves the soil for both crops and pasture. Adequately drained areas respond well to fertilizer and, if well managed, will produce good yields of corn, soybeans, grain sorghum, and many of the more moisture-tolerant legumes and grasses for hay and pasture. The low position of the soil and excess moisture during the winter may make a good stand of small grains difficult to maintain. Generally the soil in the adequately drained areas is desirable for crops that need an abundant supply of moisture during the drier parts of the growing season. Use and management are discussed under group 14 in the section Use and Management of Soils.

Wolftever silt loam (0 to 4 percent slopes) (Wo).—This moderately well drained brown soil occupies low stream terraces. It consists of general alluvium that is largely a mixture of sediments derived from sandstone, shale, and limestone. The soil is nearly level to undulating. Much of it is in irregular strips adjacent to the bottom lands along the Tennessee River. A few small areas adjoin bottom lands along the Paint Rock and Flint Rivers.

Wolftever silt loam, like Egam silty clay loam, has a compact subsoil. It is distinguished from the Egam soil by its somewhat better developed profile and by its position above normal floodwaters. Wolftever silt loam is distinguished from the Etowah soils by its more compact subsoil, somewhat slower drainage, and a less reddish color.

Profile description:

0 to 6 inches, grayish-brown to brown friable silt loam.
6 to 13 inches, brown to dark-brown friable but somewhat firm silty clay loam.
13 to 35 inches, yellowish-brown very firm silty clay loam to silty clay, weakly mottled below a depth of about 18 inches with brownish yellow and gray; limestone bedrock is at an undetermined depth, but it appears to be more than 10 feet from the surface, and in places it is probably 40 feet from the surface.

Mottling appears at variable depths. In some areas mottling appears within 12 to 14 inches of the surface, and in others it occurs below 25 inches. All of the areas along the Tennessee River have a noticeable amount of fine mica flakes. These flakes make the soil somewhat more crumbly when it is crushed.

Wolftever silt loam is a fertile soil and has a moderate amount of organic matter in the surface layer. It is medium to strongly acid. The tilth of the surface layer is good, although not quite so favorable as that of some of the more sandy soils. The subsoil is slowly permeable, and moisture infiltration is retarded considerably. Internal drainage is moderately slow; runoff, medium to slow. Most of the areas are subject to flooding when water is extremely high, but the areas along the Tennessee River are not so susceptible since a system of flood-control reservoirs was established upstream.

This soil has a moderately high capacity for holding moisture available to plants. The compact subsoil, however, inhibits root development and causes the soil to be somewhat more droughty than more permeable soils, such as Etowah silt loam.

Use suitability.—Practically all of this soil has been cleared, and much of it is now cropped. A small acreage that is not available for agricultural use may be within the boundary of the Red Stone Arsenal. Corn, cotton, soybeans, and lespedeza are the chief crops, but some fall-sown small grains and other hay crops besides soybeans and lespedeza are grown. Some fertilizer is used. Most areas are planted fairly intensively to row crops. Except during the drier season, yields are moderately high.

This soil has good workability and fairly good tilth. It is not difficult to conserve. Runoff should be carefully restrained, because any material loss of the friable surface soil will bring the compact subsoil nearer the surface and thereby make moisture conditions less favorable. Under good management the soil is well suited to intensive use for a wide variety of crops, including cotton, small grains, grain sorghum, soybeans, and most of the more desirable legumes and grasses for hay and pasture. Methods of use and management are discussed under group 2 in the section Use and Management of Soils.

Wolftever silt loam, eroded phase (2 to 4 percent slopes) (Wp).—This phase occupies low terraces along the larger streams but is mainly along the Tennessee River. It is undulating.

The surface layer is predominantly grayish-brown to yellowish-brown heavy silt loam. The subsoil is yellowish-brown, grading to moderately mottled yellowish-brown, brown, and gray, very firm silty clay or silty clay loam. Depth to bedrock appears to range from more than 10 feet to about 40 feet.

In many places so much of the original surface soil has been lost that the plow layer is now predominantly yellowish-brown firm silty clay loam. A noticeable amount of fine mica flakes occurs throughout the profile in areas along the Tennessee River. These cause the soil to be somewhat more crumbly when crushed.

Wolftever silt loam, eroded phase, is a moderately productive soil. It has a small to moderate amount of organic matter in the surface layer. The plow layer has less favorable tilth than that of Wolftever silt loam; careful tillage is required to keep it from becoming cloddy. The soil is slowly permeable to moisture and roots. The subsoil, particularly, is so compact as to retard root development. Internal drainage is moderately slow, and runoff is medium. The soil has a moderate capacity for holding moisture available to plants. Since the compact subsoil interferes with root development, however, the soil is somewhat droughty. Most areas are above the normal floodstage, but many are subject to overflow during extremely high floods. Most cultivated areas are likely to erode.

Use suitability.—All of this soil has been cleared, and most of it is cropped at the present time. The soil is planted rather intensively to crops, chief of which are cotton, corn, and soybeans. Yields are moderate.

This soil is suited to moderately intensive use for most of the general farm crops, including cotton, corn, sorghums, small grains, and soybeans and the more desirable legumes and grasses for hay and pasture. Control of runoff is necessary. Because the soil is somewhat droughty, it is not so well suited to permanent pasture and other crops that need abundant moisture during drier periods of the growing season. Use and management are discussed under group 2 in the section Use and Management of Soils.

Use and Management of Soils

Many farmers now practice good soil management, and their yields are much higher than the average for the county. In general, these farmers do these things:

1. Use good crop varieties that are adapted to the county.
2. Use a suitable rotation that will use the water on the land to the best advantage. This rotation, as a rule, will include legumes to add nitrogen; row crops to control weeds; deep-rooted crops to forage for nutrients in the subsoil and thereby increase permeability; and pasture, meadow, or green-manure crops to increase or maintain organic matter and improve tilth.
3. Return barnyard or green manure to the soil to maintain the supply of nitrogen and to add fresh organic matter.
4. Apply lime, phosphorus, nitrogen, or potassium, or a combination of these materials if needed. (The county agent should be consulted about testing the soil before lime or fertilizer is added.)
5. Carefully prepare the seedbed. (The practices of the better farmers of the county or the recommendations of the Experiment Station regarding the time and rate of planting should be followed.)
6. Use suitable measures to control weeds, insects, and diseases.

Management groups

The practices just outlined apply to all of the soils of the county, but the various soils differ in their suitability for agricultural use and in the management they need. The soils therefore have been separated into 17 different groups according to similarity in the kind of management they need. All the soils in a given group will need about the same kind of management and respond in much the same way. Each management group is shown in color on the map at the back of this report.

Suitable crops, crop rotations or cropping systems, supplementary measures for water control, and need for amendments are suggested for each management group in table 7. Each group is further discussed in the text.

TABLE 7.—*Suitable crops, rotations or cropping systems, supplementary water-control measures, and need for amendments by management groups for soils of Madison County, Ala.*

Management group and soil	Suitable crops	Rotations or cropping systems	Supplementary water-control measures	Need for amendments	Remarks
Group 1 Abernathy cherty silt loam. Abernathy fine sandy loam. Abernathy silt loam. Egam silty clay loam. Ennis silt loam. Hamblen fine sandy loam. Huntington fine sandy loam. Huntington silt loam. Lindside silty clay loam. Ooltewah fine sandy loam. Ooltewah silt loam.	Corn, sorghum, soybeans, orchardgrass, Dallisgrass, Ladino, and other white-clovers, lespedeza. Better drained soils of this group are also suited to red clover and truck crops.	1. Continuous row crop. 2. Row crop followed by legume-and-grass pasture 2 or more years. 3. Continuous pasture.	Diversion levees or ditches to restrain overflow. On less well drained soils of this group, open ditches or tiling and bedding.	Low, but many areas give good response.	Suited to intensive use but subject to floods. Abundant moisture supply makes high yields possible.
Group 1a Bruno loamy fine sand.	Corn, sorghum, melons, potatoes and other truck crops.	Continuous row crops with winter cover crops for organic matter.	Diversion levees to restrain overflow.	Very high for all nutrients; does not hold them well.	Low in fertility, droughty, subject to overflow. Not well suited to pasture.
Group 2 Etowah loam: Eroded undulating phase. Level phase. Undulating phase. Etowah silt loam: Level phase. Undulating phase. Etowah silty clay loam, eroded undulating phase. Greendale cherty silt loam. Greendale silt loam. Humphreys cherty silt loam. Humphreys silt loam. Sequatchie fine sandy loam. Sequatchie fine sandy loam, eroded phase. Wolftever silt loam. Wolftever silt loam, eroded phase.	Corn, cotton, soybeans, grain sorghum, small grains, crimson clover, many of the legumes (including alfalfa) and grasses for hay and pasture, truck crops except on Wolftever soils.	1. Continuous row crop. 2. Row crop, small grain, and hay. 3. Corn, lespedeza.	Contour tillage on the more sloping areas.	Moderately high for all plant nutrients, lime, and organic matter. Boron probably required for alfalfa.	Well suited to intensive use. Wolftever soils inclined to be cloddy.
Group 3 Cookeville silt loam: Eroded undulating phase. Undulating phase. Cumberland loam: Eroded undulating phase. Undulating phase. Decatur and Cumberland silt loams: Level phases. Undulating phases. Decatur and Cumberland silty clay loams, eroded undulating phases.	Cotton, corn, soybeans, grain sorghum, crimson clover, many of the legumes (including alfalfa) and grasses for hay and pasture, small grains, nursery stock.	1. Cotton (winter legume), corn. 2. Cotton (winter legume), corn, small grain. 3. Row crop, vetch and oats, lespedeza. 4. Row crop, small grain, alfalfa, or sericea lespedeza for several years.	Contour tillage; cover crops to follow row crops.	Moderate to moderately high for all plant nutrients, lime, and organic matter. Boron probably required for alfalfa.	Under a fairly high level of management, productive of a wide variety of crops.

TABLE 7.—*Suitable crops, rotations or cropping systems, supplementary water-control measures, and need for amendments by management groups for soils of Madison County, Ala.*—Continued

Management group and soil	Suitable crops	Rotations or cropping systems	Supplementary water-control measures	Need for amendments	Remarks
Group 3—Continued Hermitage silt loam: Eroded undulating phase. Undulating phase.					
Group 3a Baxter cherty silt loam: Eroded undulating phase. Undulating phase. Dewey cherty silty clay loam, eroded undulating phase. Etowah cherty silt loam, undulating phase. Hermitage cherty silt loam, eroded undulating phase.	Cotton, corn, soybeans, grain sorghum, crimson clover, and many of the legumes (including alfalfa) and grasses for hay and pasture, small grains, nursery stock.	Same as for group 3.	Contour tillage; cover crops to follow row crops.	Moderately high for all plant nutrients, lime, and organic matter. Boron probably required for alfalfa.	A little lower in fertility and more difficult to till than soils of group 3.
Group 4 Allen fine sandy loam: Eroded undulating phase. Undulating phase. Allen stony fine sandy loam, eroded undulating phase. Hartsells fine sandy loam: Eroded undulating phase. Eroded undulating shallow phase. Undulating phase. Undulating shallow phase. Holston fine sandy loam: Eroded undulating phase. Level phase. Undulating phase. Jefferson fine sandy loam: Eroded undulating phase. Undulating phase. Linker fine sandy loam, eroded undulating phase.	Cotton, corn, soybeans, grain sorghum, crimson clover, many of the legumes (including alfalfa) and grasses for hay and pasture, small grains, nursery stock, several truck crops. Possibly a little less suited to some legumes and grasses for pasture than soils of group 3a.	Same as for group 3.	Contour tillage; cover crops to follow row crops.	High for all plant nutrients, lime, and organic matter. Boron probably required for alfalfa.	Good tilth easily maintained. Heavy fertilization required.
Group 5 Captina and Capshaw loams, undulating phases. Captina and Capshaw silt loams: Level phases. Undulating phases. Dickson cherty silt loam: Eroded undulating phase. Undulating phase. Dickson silt loam: Eroded undulating phase. Level phase. Undulating phase.	Corn, cotton, sorghums, soybeans, small grains, many of the legumes and grasses for hay and pasture.	Same as for group 3.	None on the more nearly level parts. Contour tillage; cover crops to follow row crops on the more sloping parts.	High for all plant nutrients, lime, and organic matter.	Slow internal drainage limits range of suitability somewhat and delays tillage practices a little. Probably better suited to sericea lespedeza than to alfalfa.
Group 6 Colbert silt loam, level phase. Dowellton silt loam. Hollywood silty clay. Hollywood silty clay, eroded undulating phase. Lawrence silt loam. Monongahela fine sandy loam. Taft silt loam. Tupelo silt loam. Tupelo silt loam, overwash phase.	Legumes and grasses for hay and pasture, sorghum, small grains, corn, soybeans. Not well suited to alfalfa or truck crops.	1. Continuous pasture. 2. Small grain, hay. 3. Grain sorghum, corn, or soybeans, small grain, hay.	Some of the acreage could be improved by drainage.	High for all plant nutrients, lime, and organic matter.	All have slow internal drainage and, in general, unfavorable tilth.
Group 7 Colbert cherty silt loam, undulating phase. Colbert cherty silty clay loam, eroded undulating phase. Colbert fine sandy loam, eroded undulating phase. Colbert silt loam, undulating phase. Colbert silty clay loam, eroded undulating phase.	Grasses and legumes (including alfalfa) for hay and pasture; sorghum, cotton, small grains, corn, soybeans. Not well suited to truck crops.	1. Continuous pasture. 2. Small grain, hay. 3. Cotton, sod crops. 4. Cotton, oats, common or sericea lespedeza.	Contour tillage.	High for all plant nutrients, lime, and organic matter. Boron probably required for alfalfa.	More eroded parts are droughty and difficult to cultivate.

TABLE 7.—*Suitable crops, rotations or cropping systems, supplementary water-control measures, and need for amendments by management groups for soils of Madison County, Ala.*—Continued

Management group and soil	Suitable crops	Rotations or cropping systems	Supplementary water-control measures	Need for amendments	Remarks
Group 7—Continued Pearman loam. Talbott cherty silty clay loam, eroded undulating phase. Talbott fine sandy loam, eroded undulating phase. Talbott silty clay loam, eroded undulating phase.					
Group 8 Cookeville silt loam, eroded rolling phase. Cumberland loam, eroded rolling phase. Decatur and Cumberland silty clay loams, eroded rolling phases. Etowah silty clay loam, eroded rolling phase. Hermitage silt loam, eroded rolling phase.	Practically all crops common to the region, although notably less suited to some truck crops than smoother, more friable soils.	1. Cotton or corn-sericea lespedeza or other legumes and grasses for hay or pasture. 2. Cotton, small grain, legumes and grasses for hay or pasture.	Contour tillage; winter cover; possibly terraces and diversion ditches in places.	Moderately high for all plant nutrients, lime, and organic matter. Boron probably required for alfalfa.	Under a high level of management, responsive and productive of a wide variety of crops.
Group 9 Baxter cherty silt loam: Eroded rolling phase. Rolling phase. Dewey cherty silty clay loam, eroded rolling phase. Dickson cherty silt loam: Eroded rolling phase. Rolling phase. Hermitage cherty silt loam: Eroded rolling phase. Rolling phase.	Corn, cotton; sorghums, soybeans; small grains; many legumes and grasses for hay and pasture excepting alfalfa.	Same as group 8	Contour tillage and winter cover.	High for all plant nutrients, lime, and organic matter.	Requires heavy fertilization for large yields. Chert interferes somewhat with cultivation.
Group 10 Colbert cherty silty clay loam, eroded rolling phase. Colbert silty clay loam, eroded rolling phase. Talbott cherty silty clay loam, eroded rolling phase. Talbott fine sandy loam, eroded rolling phase. Talbott silty clay loam, eroded rolling phase.	Small grains; legumes and grasses for hay and pasture; some row crops, as corn, cotton, soybeans, and sorghum.	1. Chiefly sod crops, including sericea lespedeza. Row crop once in 4 to 7 years.	Contour tillage and winter cover.	High for all plant nutrients, lime, and organic matter. Boron probably required for alfalfa.	Somewhat droughty and cloddy. Better suited to small grains, hay, and pasture than to row and truck crops.
Group 11 Allen fine sandy loam, eroded rolling phase. Allen stony fine sandy loam, eroded rolling phase. Hartsells fine sandy loam: Eroded rolling phase. Eroded rolling shallow phase. Rolling phase. Rolling shallow phase. Jefferson fine sandy loam, eroded rolling phase. Jefferson stony fine sandy loam, eroded rolling phase.	Corn, cotton, sorghum, soybeans, small grains, legumes and grasses, many truck crops.	1. Sod crop, as sericea lespedeza, with a row crop 1 year out of 3 to 6. 2. Row crop, small grain, sod crop 3 or 4 years.	Contour tillage, winter cover, possibly terraces and diversion ditches in places.	Very high for all plant nutrients, lime, and organic matter. Boron probably required for alfalfa.	Suited to a wide variety of crops; has better tilth and lower fertility than soils of group 10.
Group 12 Allen clay loam, severely eroded rolling phase. Baxter cherty silty clay loam: Severely eroded rolling phase. Severely eroded undulating phase. Decatur and Cumberland silty clays: Gullied phases. Severely eroded rolling phases. Severely eroded undulating phases.	Small grains, legumes and grasses for hay and pasture.	1. Sod crops, as sericea lespedeza, with cotton every 4 to 7 years. 2. Permanent pasture.	Contour tillage, winter cover, diversion ditches.	High for all plant nutrients, lime, and organic matter. Boron probably required for alfalfa.	Limited supply of moisture, slow infiltration of water, and unfavorable tilth greatly limit the usefulness of these soils.

TABLE 7.—*Suitable crops, rotations or cropping systems, supplementary water-control measures, and need for amendments by management groups for soils of Madison County, Ala.*—Continued

Management group and soil	Suitable crops	Rotations or cropping systems	Supplementary water-control measures	Need for amendments	Remarks
Group 12—Continued Dewey cherty silty clay: Severely eroded rolling phase. Severely eroded undulating phase. Hermitage cherty silty clay loam, severely eroded rolling phase. Talbott cherty silty clay, severely eroded rolling phase.					
Group 13 Allen stony fine sandy loam, eroded hilly phase. Baxter cherty silt loam: Eroded hilly phase. Hilly phase. Baxter cherty silty clay loam, severely eroded hilly phase. Bodine cherty silt loam: Eroded hilly phase. Hilly phase. Hermitage cherty silt loam, eroded hilly phase. Muskingum fine sandy loam, hilly phase. Talbott-Colbert cherty silty clay loams, eroded hilly phases.	Legumes and grasses for pasture.	Permanent pasture. Very occasional row crop.	Maintenance of good sod.	High to very high for all plant nutrients, lime, and organic matter.	Stoniness and strong slope make these soils poorly suited to cultivation.
Group 14 Dunning silty clay. Guthrie silt loam. Lee silt loam. Lee-Lobelville cherty silt loams. Lee-Lobelville silt loams. Lickdale silt loam. Melvin silty clay loam. Prader fine sandy loam. Robertsville silt loam. Tyler very fine sandy loam.	Legumes and grasses for permanent pasture, corn, sorghum, soybeans and other annual legumes, grasses.	Permanent pasture in natural state. Continuous row crops or short rotations if drained.	Artificial drainage.	Dunning, Lee, Lobelville, Melvin, and Prader, medium, especially for phosphorus and potash. For the other soils, high to very high for all plant nutrients, lime, and organic matter.	Suited to some row crops and many legumes and grasses if adequately drained.
Group 15 Stony colluvium, Jefferson and Colbert soil materials. Stony rolling land, Talbott and Colbert soil materials. Stony smooth land, Talbott and Colbert soil materials.	Legumes and grasses for permanent pasture.	Permanent pasture or forest.	Maintenance of good sod.	Medium to high, especially for phosphorus and lime.	Too stony for cultivation, except for small included less stony patches.
Group 15a Bodine cherty silt loam, steep phase. Made land. Muskingum stony fine sandy loam: Hilly phase. Steep phase. Pits: Clay. Gravel. Rockland, limestone: Hilly. Rolling. Steep. Stony steep land, Muskingum soil material.	Forest	Permanent forest	Permanent forest	Fertilization generally not practical.	Not sufficiently productive for pasture or crops.

For each management group there is a table showing yields to be expected under two levels of management—the prevailing management and the improved management practiced by a few of the better farmers of the county.

In columns A of these tables are yields obtained under prevailing management, and columns B, yields to be obtained under improved management. The average estimated yields are based on records for at least a 5-year period. The yields in columns B can be obtained by following management methods that most farmers in the county will find practical. In fact, yields higher than those given in columns B can be obtained in favorable seasons, especially if heavier fertilization is practiced. To increase yields from those shown in columns A to those in columns B will require at least two rotation cycles under the improved level of management. Frequently, higher yields are obtained than those given for the improved level of management.

The yields given in the tables are subject to change. New crop varieties and new cultural practices may increase yields, and new plant diseases or insect pests may affect them adversely.

Management requirements for permanent pasture as well as for tilled crops are discussed for most of the groups. The management requirements for pasture may be similar for two or more groups, but each group has management requirements for tilled crops that distinguish it from all of the other groups. This happens because, on most soils, tilled crops require more exacting management than pasture.

Management group 1

The soils of management group 1 (listed in table 8) are nearly level to very gently sloping and are well drained to imperfectly drained. They are widely distributed and cover approximately 14 percent of the total area of the county. These soils occur on first bottoms or along small drainageways on slopes derived from local alluvium. The Abernathy and Ooltewah soils are on local alluvium and ordinarily are not subject to overflow. They may be flooded temporarily during heavy rains. The Egam, Ennis, Huntington, Hamblen, and Lindside soils are on bottom lands. All the soils on bottom lands are subject to floods except when they are protected by levees or other structures.

The Abernathy, Ennis, and Huntington soils are well drained; they are free of mottling to a depth of 25 inches or more. Although Egam silty clay loam is well drained in the plow layer and upper subsoil, drainage is somewhat slow in the lower part because of the compactness of the lower layer. The Hamblen, Lindside, and Ooltewah soils, all imperfectly drained, are mottled to within 10 to 14 inches of the surface.

All of the soils of this management group have moderately high to high fertility. The soil material is uniformly thick and is permeable to roots and moisture. The capacity of these soils for holding moisture available to plants is high. Their plow layers have a desirable texture, and tilth is good.

Use and management.—Much of the acreage of the soils of this group has been cleared and is used for crops, but a considerable part is pastured. Little is under forest. Corn is the most extensive crop, and hay is second in importance. Yields are moderately high. Usually, only light applications of fertilizer are added, and in places none is used. A few of the areas that have poor natural drainage have been drained artificially. Floods during the growing season cause some crop losses to occur on the soils of the first bottoms.

The smooth surface, abundant moisture, good tilth, and high natural fertility make these soils suitable for intensive use. As a rule they can be used continuously for row crops, and good yields are possible if high fertility is maintained.

The variety of crops that can be grown is somewhat limited, however, especially on the imperfectly drained soils. Such soils are not well suited to the high-value crops because of danger from floods. Small grains, particularly those on the soils that are not so well drained,

TABLE 8.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on soils of management group 1, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates crop specified is not commonly grown or the soil is not suited to its production]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Abernathy cherty silt loam	35	65	300	500	12	20	33	50	2.9	3.8	1.2	1.8	125	185	150	225
Abernathy fine sandy loam	30	60	300	500	12	22	40	50	2.8	3.6	1.1	1.7	120	190	145	215
Abernathy silt loam	40	70	300	500	12	20	33	50	3.1	4.0	1.3	1.8	130	190	160	240
Egam silty clay loam	30	50	250	450	16	24	35	60			1.0	1.5			110	180
Ennis silt loam	35	65	300	500	18	24	35	60	3.0	3.8	1.2	1.8	90	140	130	210
Hamblen fine sandy loam	30	60	200	480			30	50			1.2	1.8			125	190
Huntington fine sandy loam	30	60	300	500	12	22	40	50	2.8	3.6	1.1	1.7	120	190	145	215
Huntington silt loam	40	70	300	500	10	20	40	50	3.1	4.0	1.3	1.8	130	190	160	240
Lindside silty clay loam [2]	40	70		400		18		48			1.4	1.8			170	240
Ooltewah fine sandy loam [2]	30	60		400	10	20	34	48			1.1	1.7			145	215
Ooltewah silt loam [2]	40	70		400		18		48			1.4	1.8			170	240

[1] The term "cow-acre-days" is used to express the days per year that 1 acre will graze 1 cow without injury to the pasture.
[2] Yields in columns B obtained under management that includes adequate drainage.

have a tendency to lodge. Small grains are also more subject to such diseases as rust than they are when grown on higher soils. These soils are particularly suitable for corn, grain sorghum, and soybeans and many of the other legumes and grasses for hay and pasture. The more poorly drained soils are not suitable for potatoes and other root crops.

The soils will produce fairly high yields without fertilizer. They respond well to fertilizer because they have abundant moisture and favorable permeability. In some areas use of lime for the more exacting legumes will be justified. In other places, lime may not be needed. Generally, if row crops are adequately fertilized, they can be spaced more closely than on soils that have less moisture.

Except on the more clayey areas, good tilth is moderately easy to maintain on the soils of this group. Excessive moisture, however, delays field work in the spring and after rains, especially on the more poorly drained soils. Artificial drainage and the straightening of channels may improve this condition somewhat. In areas where floodwaters have a strong current, the soil of the plow layer should not be allowed to lie loose late in winter and early in spring. The flood hazard is greatest at that time, and extensive damage may result from scouring. Crop yields will be improved by control or eradication of the weeds that grow abundantly on these soils because of the fertility and good moisture supply.

The abundant moisture and high fertility of the soils make them favorable for pasture. If stands of legumes and pasture grasses are good, the pasture will have a high carrying capacity throughout much of the grazing season. A good pasture mixture consists of fescue and white-clovers, including Ladino clover, but orchardgrass, Dallisgrass, bluegrass, and the annual lespedezas are also suitable for pasture seeding. Lime, a substantial application of phosphorus and potash, and enough nitrogen to get the seeding well established are important in obtaining a vigorous stand. Proper care of pastures, especially on these fertile bottom-land soils, requires that weeds and excess growth of the edible plants be kept down. This can best be done by mowing periodically during the growing season. If grazing is heavy, it may be practical to scatter droppings.

Management group 1a

The only soil in management group 1a is Bruno loamy fine sand (see table 9). It is generally very sandy and is gravelly in places. It occurs on natural levees and outwash fans, mainly in narrow strips adjacent to the larger streams. The areas are usually a little higher than the associated bottom-land soils, but they are nevertheless subject to floods. The total area is small.

This soil is very permeable, and as a result internal drainage is excessive. Moisture, however, is generally available to the deep-rooted crops because the water table is usually within 4 to 6 feet of the surface. Natural fertility is very low, and the content of organic matter is low. Plant nutrients are leached out easily because of the porous texture of this soil.

Use and management.—Most of this soil has been cleared, and most of it is pastured. Some acreage is planted to corn and to such crops as potatoes, melons, and soybeans. Yields are variable, but on the whole they are not high under average management. Some crops are fertilized, but pasture usually is not.

The sandy texture of the soil greatly limits its range of suitability for crops. It is too droughty for shallow-rooted crops such as small grains and for some of the grasses for pasture and hay. It is suited, however, to early spring vegetables and to the deeper rooted crops, including corn, melons, early potatoes, alfalfa, and sericea lespedeza. Bermudagrass ordinarily develops a good cover for pasture but has limited grazing value.

The low fertility and porous texture make heavy fertilization necessary for high yields of the crops suited to the soil. All plant nutrients are lacking; legumes will very likely need lime. Generally fertilizer should be added in small amounts at frequent intervals rather than in one or two heavy applications. This soil is well suited to intensive use where fertility is maintained, as it is not subject to damage from runoff water. In places it may be damaged by scouring if the main current of the stream leaves its banks during floods.

This soil is very easily worked and can be tilled throughout a wide moisture range. Its low fertility and sandy texture make weed control easy.

Management group 2

The soils of management group 2 (listed in table 10) are moderately well drained to well drained. Their surface is undulating to smooth. They occur on low stream terraces and local alluvium. The separate areas are not large. The soils are widely distributed through the county, however, and cover approximately 7 percent of its total area. Much of the acreage lies on moderately narrow strips along drainageways and is associated with upland soils.

These soils are deep to bedrock and are permeable to a depth of several feet. Generally they have abundant moisture for plants. They are moderate in fertility and are medium to strongly acid. Chert somewhat interferes

TABLE 9.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on soils of management group 1a, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those under columns B are obtained under improved management]

Soil	Corn		Wheat		Oats		Soybean hay		Lespedeza hay		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Bruno loamy fine sand	25	45	11	16	20	30	1.3	2.0	1.0	1.4	70	140	80	125

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

TABLE 10.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 2, Madison County, Ala.*

[Yields in columns A are those obtained under prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates the crop specified is not commonly grown or the soil is not suited to its production]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Etowah loam:																
Eroded undulating phase	28	58	330	530	17	24	29	50	2.6	3.3	0.7	1.8	80	130	85	185
Level phase	30	60	350	550	18	25	32	55	2.8	3.5	.8	1.9	85	135	100	200
Undulating phase	30	60	350	550	17	24	30	53	2.7	3.4	.7	1.8	80	130	90	190
Etowah silt loam:																
Level phase	30	65	350	550	18	26	32	57	2.8	3.6	.8	2.0	85	135	105	200
Undulating phase	30	65	350	550	18	25	32	55	2.8	3.5	.8	1.9	85	135	100	200
Etowah silty clay loam, eroded undulating phase	28	60	350	550	17	25	30	53	2.7	3.4	.7	1.9	80	130	90	190
Greendale cherty silt loam	27	60	270	490	12	23	30	58	2.7	3.6	.9	1.7	85	135	100	200
Greendale silt loam	30	65	280	500	13	24	32	60	2.8	3.8	1.0	1.8	90	140	110	210
Humphreys cherty silt loam	28	60	330	510	17	24	30	58	2.6	3.4	.9	1.6	85	130	80	175
Humphreys silt loam	30	65	340	520	18	25	32	58	2.7	3.5	1.0	1.8	90	140	95	195
Sequatchie fine sandy loam	28	65	350	550	18	25	30	55	2.1	3.5	.7	1.5	120	185	90	170
Sequatchie fine sandy loam, eroded phase	27	65	350	550	18	25	30	55	2.1	3.5	.7	1.5	120	185	90	170
Wolftever silt loam	24	42	300	490	14	22	30	56	-----	-----	.9	1.4	-----	-----	90	150
Eroded phase	22	40	290	480	13	20	27	54	-----	-----	.8	1.3	-----	-----	85	140

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

with tillage in some areas. Tilth is good, however, because of the texture and consistence of the soils.

Use and management.—Much of the acreage is cropped intensively. Cotton and corn are the predominant crops, but some hay or pasture is rotated with cotton or corn. Lime has been applied to much of the acreage. Only moderate amounts of fertilizer are used, especially for row crops. It is usually unnecessary to till on the contour, and as a rule this is not done. Contour tillage is suggested for some of the sharper breaks.

The smooth surface, good tilth, favorable moisture, and responses to fertilizer make these soils well suited to numerous crops. These include cotton, alfalfa, and many truck crops, such as potatoes, cabbage, beans, and strawberries. Much of the acreage can be cropped intensively if fertility is maintained. The more sloping areas, however, need at least a moderately short rotation.

Organic matter and nitrogen, phosphorus, and potash must be replenished regularly in order to obtain high yields under consistent cropping. Lime is needed for legumes, and boron applications will probably be needed to maintain good stands of alfalfa. In general these soils are well suited to legumes for cover crops, and part of the required nitrogen and organic matter can be obtained by planting winter legumes for green manure.

The moderate internal drainage and favorable texture make good tilth easy to maintain. The plow layers are easily tilled except in the more cherty areas. In these areas the chert fragments are so abundant that they make hand cultivation difficult and interfere to some extent with the use of heavier implements. In general, heavy machinery is not needed to prepare seedbeds satisfactorily.

Runoff water is not a great hazard. The drainage channels common to the areas of the Greendale soils, however, may need attention to keep them from damaging the fields by changing their courses or becoming deeper. Some areas of the Greendale and Humphreys soils may be benefited by diverting runoff water from the adjacent upland soils.

The soils of this management group are suitable for pasture. To maintain a desirable sod, their fertility must be brought to a fairly high level and lime applied. A suitable pasture mixture for seeding these soils consists of such legumes and grasses as fescue and whiteclover.

Management group 3

Management group 3 consists of reddish well-drained soils (listed in table 11) that have moderately firm subsoils. These soils are nearly level to undulating and occur on stream terraces, colluvial slopes, and uplands. They resemble the soils in group 2 in many ways, but they occupy somewhat better drained and higher lying positions and have a somewhat more mature profile development.

This group has the most extensive acreage suited to crops; it covers about 17 percent of the county. The areas are widely distributed throughout the southern, central, and western parts of the county, and separate tracts are large in many places.

These soils are moderately deep to bedrock. Except for the Decatur and Cumberland silty clay loams, their plow layers consist of loams to silt loams. The soils are permeable to roots and moisture. Most of them have a moderately high capacity for holding moisture available to plants. The organic-matter content ranges from high in the less eroded soils to moderately low in the more severely eroded ones. The soils are medium to strongly acid.

Use and management.—Most of the soils of this management group are cleared, and much of the acreage is cropped. Cotton predominates, but corn is nearly as important. Smaller acreages of grain sorghum and soybeans, alfalfa, and other legumes and grasses for hay and pasture are grown. Some acreage is used for small grains,

TABLE 11.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 3, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Cookeville silt loam:																
Eroded undulating phase	25	50	300	520	16	23	30	50	2. 1	3. 2	0. 7	1. 4	80	120	80	160
Undulating phase	28	55	350	550	18	25	32	55	2. 1	3. 2	. 7	1. 5	80	120	85	165
Cumberland loam:																
Eroded undulating phase	25	50	320	520	16	23	29	50	2. 7	3. 3	. 7	1. 4	80	120	80	160
Undulating phase	28	55	350	550	18	25	30	55	2. 8	3. 4	. 8	1. 6	80	120	90	175
Decatur and Cumberland silt loams:																
Level phases	35	62	380	580	20	27	35	57	3. 0	3. 6	. 9	1. 7	90	140	100	200
Undulating phases	32	55	380	580	20	27	35	57	3. 0	3. 5	. 8	1. 7	85	130	95	190
Decatur and Cumberland silty clay loams, eroded undulating phases	28	50	350	550	18	25	30	55	2. 8	3. 4	. 8	1. 7	80	120	90	175
Hermitage silt loam:																
Eroded undulating phase	28	50	350	550	17	24	30	52	2. 2	3. 2	. 7	1. 5	75	115	90	175
Undulating phase	30	55	380	580	18	26	33	55	2. 3	3. 3	. 7	1. 5	80	120	95	185

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

truck crops, and nursery crops. A large part of the acreage is planted to row crops continuously for several years. Practically all of the row crops are fertilized moderately. Some cover crops are grown for green manure, and lime has been applied to much of the acreage. Runoff water on the more sloping areas is not controlled adequately in many places. The level of management is generally not high, although some farmers practice very good management.

Except on the more eroded areas, the plow layer has good tilth and is not difficult to work to a good seedbed. However, more power is needed to till these soils than soils like Sequatchie fine sandy loam and Hartsells fine sandy loam. They should not be worked when too wet, although they can be tilled at a fairly wide moisture range. Increasing the supply of organic matter will help to maintain good tilth.

On the level phases and the smoothest parts of the undulating phases, erosion is not a great hazard. Runoff causes erosion on the more sloping areas, however; the soils should therefore be tilled on the contour, and row crops should be followed by a winter cover crop. On the more sloping areas, where fertility is somewhat low, a longer rotation may be desirable than is necessary for the group as a whole.

This group, in general, consists of strong soils; that is, they have at least a moderate reserve of plant nutrients and they retain added plant nutrients well. They are suitable for a number of crops, including cotton, corn, and many truck crops. They are not so suitable for many of the truck crops, however, as the more permeable friable soils such as Sequatchie fine sandy loam.

These soils are especially well suited to the more desirable legumes and grasses for hay and pasture. They do not have quite so abundant a moisture supply for pasture as such soils as the Huntington and Abernathy silt loams and Lindside silty clay loam. They are among the most desirable soils for cotton. They can be cropped intensively, but for most of the acreage 3- or 4-year rotations should be used.

All of these soils, although naturally of moderately high fertility, respond well to fertilizers. Phosphorus is the chief fertilizer needed, and lime is the principal supplement required. However, if high yields are to be maintained, nitrogen and potash in moderate amounts will also be necessary. Boron is needed for good stands of alfalfa. These soils lose their organic matter where tilled crops are removed. Legume winter cover crops, turned under as green manure in the spring, and barnyard manure are the most suitable sources of organic matter.

These soils are well suited to pasture, but they need lime, adequate fertilizer, and proper seeding. Fescue, orchardgrass, Dallisgrass, sericea lespedeza, and white-clovers are among the more desirable pasture plants. If fertility is brought to a high level, and a desirable vegetation is established, these soils will afford good pasture except during the driest periods of the grazing season. Weeds are likely to be a detriment, especially where fertility is high. The pastures should be mowed periodically to keep the weeds from competing for moisture and plant nutrients.

Management group 3a

Enough chert in their plow layers to interfere materially with tillage, and a little lower fertility, distinguish the soils of management group 3a (listed in table 12) from the ones in groups 3 and 4. The soils of this group are undulating, well drained, and moderately to considerably deep to bedrock. They cover about 3½ percent of the county and are widely distributed throughout the southern and central parts.

These soils are moderately fertile and have at least a small amount of organic matter in the plow layer. They are medium to strongly acid. The subsoils are firm, but they are permeable to roots and moisture. The soils have a moderate capacity for holding moisture available to plants. Except in the cherty or more eroded areas, they have good tilth.

Use and management.—Much of the acreage is cleared and used for crops, mainly cotton, corn, and hay. Some

TABLE 12.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 3a, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Baxter cherty silt loam:																
Eroded undulating phase	22	42	330	500	16	21	27	50	1. 9	3. 0	0. 6	1. 4	70	110	70	150
Undulating phase	24	42	340	520	16	21	27	50	1. 9	3. 0	. 6	1. 4	75	120	70	150
Dewey cherty silty clay loam, eroded undulating phase	26	48	330	500	16	23	28	50	2. 1	3. 2	. 7	1. 5	75	115	80	160
Etowah cherty silt loam, undulating phase	28	57	330	520	16	24	28	52	2. 7	3. 4	. 7	1. 8	80	130	90	190
Hermitage cherty silt loam, eroded undulating phase	26	48	330	510	16	22	28	50	2. 1	3. 0	. 7	1. 4	75	115	85	170

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

of the acreage is planted to row crops for several years in succession. On a small part, moderately long rotations are used. Some small areas may lie idle for a few years. Some fertilizer is used for row crops; much of the soil has been limed. In general, the content of organic matter is not maintained at a high level, and runoff water is not controlled adequately on much of the acreage.

Although the soils of group 3a have a lower general fertility level than the soils of group 3, they are well suited to a number of crops. These include cotton, alfalfa, some truck crops, and most of the legumes and grasses for hay and pasture. Most of these soils warm early in the spring and are therefore somewhat more favorable for early crops than some of the fine-textured chert-free soils. Where the fertility is maintained at a high level, most of the acreage can be used in a moderately short rotation (about 3 years).

Generally the fertilizer requirements are a little higher than for the soils of group 3. If the more exacting legumes are to be grown, lime is necessary. To maintain high productivity, substantial amounts of organic matter must be applied at intervals. If the supply of barnyard manure is inadequate, a legume cover crop is of considerable value if turned under. Regular applications of boron are needed to maintain good stands of alfalfa.

Maintenance of good tilth for these soils, especially for the more eroded areas, requires some attention. Applications of organic matter will improve tilth, and the soils should not be worked when too wet. Tillage, expecially on the more sloping areas, should be on the contour to check erosion caused by runoff water. Terracing may be necessary in some places. Some of the less fertile, more sloping areas may require moderately long, 4- to 5-year, rotations to control runoff water.

These soils support good pasture. For high productivity, however, heavy fertilization and proper seeding are required. Generally good grazing is more difficult to maintain on these soils than on those of group 3. Lime and mixed fertilizers are needed to establish pastures. Probably additional applications of fertilizer at intervals will be necessary in order to maintain a highly productive pasture. In most places periodic mowing will help remove excess plant growth and suppress weeds. Much of the acreage is somewhat more droughty for pasture than the more silty areas of the soils in group 3.

Management group 4

Soils of management group 4 (listed in table 13) are well drained to excessively drained. Most of them are undulating. Their plow layers consist of fine sandy loam or loam; their subsoils, although moderately firm, are more permeable and friable than those of the soils in group 3.

These soils cover nearly 3 percent of the county. The Hartsells and Linker soils occur on smooth mountain ridges, which are capped by sandstone. A small acreage of Linker soil is associated with the Hartsells soils on the mountaintops. The Allen and Jefferson soils occupy the smoother parts of old colluvial slopes at the foot of the mountains. The Holston soils occur on nearly level, moderately high stream terraces. They are located mainly in the vicinity of New Hope.

The soils are medium to strongly acid; their content of organic matter and plant nutrients is low. Depth to bedrock varies but ranges from about 14 inches in the shallow Hartsells soils to 7 to 8 feet in the Allen and Jefferson soils, or to 3 to 15 feet in the Holston soils. Except for the shallow phases of the Hartsells soils, the capacity for holding moisture is moderate. In addition, the soils are permeable enough for roots to penetrate deeply. As the Hartsells and Linker soils occupy positions on mountaintops, they are in a slightly cooler climate than the Jefferson, Allen, and Holston soils.

Use and management.—Some of the Hartsells soils are still under forest, but much of the acreage of Jefferson, Allen, and Holston soils has been cleared. Much of the cleared acreage is terraced, and the terraces are well maintained. Cotton is the predominant crop grown on the soils of this group, and corn is second in acreage. Row crops are grown successively for several years on some of the soils, and they receive moderate to heavy applications of fertilizer. A large part of the tilled acreage has been limed.

The moderately sandy plow layers make tillage easy. Except on the small patches where the more clayey subsoil makes up a large part of the plow layer, good tilth is easy to maintain. Excess moisture percolates through the soil rather rapidly. In general, these soils can be tilled throughout a fairly wide moisture range. Tillage is feasible for longer periods than on most of the other soils.

TABLE 13.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 4, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates the crop specified is not commonly grown]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Allen fine sandy loam:																
Eroded undulating phase	25	50	300	520	16	23	28	50	2. 1	3. 2	0. 6	1. 4	80	120	80	160
Undulating phase	27	55	350	550	18	25	30	55	2. 1	3. 2	. 7	1. 5	80	120	80	160
Allen stony fine sandy loam, eroded undulating phase	23	45	290	500	15	22	26	48	2. 0	3. 1	. 6	1. 3	80	120	75	155
Hartsells fine sandy loam:																
Eroded undulating phase	26	58	325	625	15	22	25	50		3. 0	. 8	1. 5	150	200	55	150
Eroded undulating shallow phase	21	48	250	460	10	18	20	40		2. 6	. 5	1. 2	95	145	45	130
Undulating phase	26	60	350	625	15	22	25	50		3. 0	. 8	1. 5	125	200	55	150
Undulating shallow phase	24	50	280	500	11	20	20	42		2. 7	. 6	1. 3	100	150	45	135
Holston fine sandy loam:																
Eroded undulating phase	24	45	320	520	16	21	27	50	1. 8	2. 9	. 6	1. 4	80	120	75	155
Level phase	27	50	320	520	18	25	30	55	1. 9	3. 0	. 7	1. 5	85	125	80	160
Undulating phase	24	50	320	520	16	21	27	50	1. 8	2. 9	. 6	1. 4	80	120	75	155
Jefferson fine sandy loam:																
Eroded undulating phase	24	45	320	520	14	21	26	50	1. 8	2. 9	. 5	1. 3	75	120	75	155
Undulating phase	24	45	320	520	16	21	27	50	1. 8	2. 9	. 6	1. 4	80	120	75	155
Linker fine sandy loam, eroded undulating phase	27	49	350	625	15	22	26	52		3. 0	. 8	1. 5	150	200	60	150

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

The good tilth, smooth surface, moderately favorable moisture, and capacity to respond well to good management make these soils suitable for a number of crops. These include cotton, sorghum, and soybeans and many other legumes and grasses for pasture and hay, and numerous truck crops such as strawberries, beans, and potatoes. Organic matter and large amounts of nitrogen, phosphate, and potash are needed for high yields. If the more desirable legumes are to be grown, it is necessary to apply 1 to 2 tons of crushed limestone, and it may be necessary to relime in 8 or 10 years. As a rule, regular applications of boron will be needed for good stands of alfalfa.

Where fertility is maintained at a high level, moderately short rotations can be used. On the more sloping areas, especially where the fertility is not kept high, a 4-year rotation is advisable. The higher elevation and slightly cooler climate make the Hartsells and Linker soils more suitable than the lower lying soils for pasture, hay and certain vegetable crops.

Generally these sandy loam soils are not so productive of pasture as silt loam soils such as the Cumberland, Cookeville, and Etowah, but plant roots can penetrate the soils to a great depth. Adequate fertilizer, lime, and proper seeding make the carrying capacity and quality of pasture on these soils very close to those expected on the more fertile silty soils. If weeds or excess herbage develop, periodic mowing will keep the grazing vegetation palatable.

Management group 5

The soils of management group 5 (listed in table 14) are distinguished by a siltpan or mottled layer at a depth of about 25 inches. Although these soils are moderately well drained, their internal drainage is considerably impaired by this layer. Their surface is nearly level to undulating. The depth to bedrock ranges from moderate to deep. The plow layers are predominantly easily worked silt loam.

These soils cover about 7 percent of the county, and some of the separate areas are of medium to large size. The Captina and Capshaw soils occupy moderately high stream terraces, chiefly in the southeastern part of the county. The Dickson soils occur principally in the northwestern quarter of the county.

The content of plant nutrients and organic matter is moderately low. The soils are medium to strongly acid. Their capacity for holding moisture available to plants is moderately high. Where the siltpan is strongly developed, the moisture supply is limited during the drier parts of the growing season. In contrast, the siltpan impairs percolation during extremely wet periods. As a rule, the subsoil over the siltpan is not so firm or clayey as that in such soils as the Decatur and Hermitage.

Use and management.—Some acreage of the Dickson soils is still under cutover forest, but a large part of the Captina and Capshaw soils has been cleared and is now cropped or pastured. The principal crops on soils of this management group are cotton, corn, soybeans, and lespedeza. In a few areas, grasses and other legumes are grown for hay and pasture. Winter cover crops consist of fall-sown small grains and winter legumes.

A considerable part of the acreage has been limed. At least moderate applications of mixed fertilizer are applied to row crops, chiefly to cotton. Some areas need runoff control in order to get better results from winter legumes.

The soils of the group are suited to a fairly large number of crops. Their low fertility, however, and the siltpan or mottled layer somewhat decrease the range and productivity of crops. Chiefly because the siltpan impairs drainage, these soils are not well suited to alfalfa. Their drainage also delays preparation for spring planting, and

TABLE 14.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 5, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates the crop specified is not commonly grown or the soil is not suited to its production]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Captina and Capshaw loams, undulating phases	28	55	250	500	12	20	30	53	-----	3. 0	0. 8	1. 7	85	125	95	190
Captina and Capshaw silt loams:																
Level phases	28	55	200	400	12	20	25	50	-----	-----	. 8	1. 7	80	120	100	195
Undulating phases	28	55	240	480	12	20	30	53	-----	3. 0	. 8	1. 7	80	120	95	190
Dickson silt loam:																
Eroded undulating phase	22	42	320	520	14	20	27	50	-----	2. 8	. 6	1. 4	70	115	70	150
Level phase	20	40	300	500	14	20	27	50	-----	2. 8	. 7	1. 5	70	115	80	170
Undulating phase	22	42	340	520	14	20	27	50	-----	2. 8	. 6	1. 4	75	120	70	150
Dickson cherty silt loam:																
Eroded undulating phase	20	40	310	500	13	19	26	48	-----	2. 8	. 6	1. 4	70	115	65	140
Undulating phase	20	40	310	500	13	19	26	48	-----	2. 8	. 6	1. 4	75	120	65	140

[1] The term "cow-acre-days" is used to express the number of days per year that one acre will graze 1 cow without injury to the pasture.

generally they are colder than the better drained soils, such as those in groups 3, 3a, and 4. Boll weevil damage is usually greater than on the better drained red soils.

Among the crops for which the soils are best suited are corn, soybeans, small grains, cotton, and most of the legumes and grasses other than alfalfa. Except on the small acreage that has a considerable slope, the soils are usually suitable for moderately short rotations. A 4-year rotation and contour tillage may be necessary on the more sloping areas to keep the soil from eroding. Terraces may be practical in a few places.

These soils are capable of supporting good grazing vegetation and will maintain a high carrying capacity if seeded with a mixture of desirable grasses and legumes. They will need lime and moderately heavy applications of fertilizer, especially of phosphorus and potash. Some nitrogen may be needed to get the plants started. If weeds develop or excessive grazing vegetation accumulates, the pastures should be mowed periodically to maintain a palatable grazing cover.

Management group 6

The soils of management group 6 (listed in table 15) are characterized by slow internal drainage and rather clayey subsoils. All of them have a nearly level surface, although very gentle slopes occur on some of the acreage. Most of these soils occupy rather low areas.

The Colbert, Dowellton, and Hollywood soils are shallow to limestone bedrock; they are very clayey in texture. The Lawrence soil occurs over deep beds of chert derived from impure limestone. This soil is moderately deep to unweathered chert, and depth is considerable to bedrock limestone. The Monongahela, Taft, and Tupelo soils occur on stream terraces.

TABLE 15.—*Average acre yields of crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 6, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates the crop specified is not commonly grown]

Soil	Corn		Cotton (lint)		Wheat		Oats		Lespedeza hay		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Colbert silt loam level phase	16	38	160	350	12	22	20	45	0. 7	1. 2	75	140
Dowellton silt loam	12	33	160	350	12	22	20	43	. 5	1. 0	75	140
Hollywood silty clay	30	45	------	300	15	30	30	60	. 5	1. 0	100	180
Eroded undulating phase	28	43	------	300	14	28	28	55	. 5	1. 0	80	160
Lawrence silt loam [2]	20	45	------	375	10	20	26	50	. 7	1. 5	80	160
Monongahela fine sandy loam [2]	18	40	------	350	8	18	24	46	. 6	1. 3	70	150
Taft silt loam [2]	20	45	------	375	10	20	26	50	. 7	1. 5	80	160
Tupelo silt loam	15	35	200	400	9	18	18	40	. 7	1. 2	70	130
Overwash phase	25	45	250	500	10	20	20	42	. 8	1. 4	80	160

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.
[2] Yields in columns B obtained under management that includes adequate drainage.

The soils of this management group cover about 4 percent of the county. In general they are only moderately fertile, and none of them have a high content of organic matter. Except for the Hollywood soils, which are slightly acid to slightly alkaline, these soils are medium to strongly acid.

Use and management.—Approximately three-fourths of the area of the soils of this management group has been cleared. The uncleared areas are chiefly under cutover native deciduous forest. About 60 percent of the cleared acreage is cropped, and the rest is mainly in unimproved pasture or is idle. The predominant crops are corn, cotton, and lespedeza for hay, and yields generally are fair to moderate. Most of the areas are not fertilized heavily. Drainage has been improved in a few places by means of open ditches.

The soils of this group are fairly well suited to crops and pasture. However, their poor internal drainage and predominantly clayey subsoils restrict the range of crops to which they are suited and the management practices that can be used. Among the crops for which they are most suitable are grain sorghums, small grains, and soybeans, and some other legumes and grasses for hay and pasture. Corn is well suited to most areas, but many areas are a little too wet to be good cotton land. Late plantings of cotton are feasible on some of the acreage. The Hollywood soils have the widest range of suitability for crops, and the Tupelo soils rank next.

These soils are suited to intensive use if fertility is maintained at a high level, as they are not subject to erosion and retain plant nutrients well. All except the Hollywood soils require lime for the more desirable legumes. Hollywood silty clay has moderate inherent fertility and a fairly high content of organic matter. The other soils have a moderately low natural fertility and low organic-matter content. Practically all of the soils need phosphorus, and all except the Hollywood soils are low in nitrogen.

Tilth of the plow layer is unfavorable in most of these soils. The plow layers in much of the Monongahela fine sandy loam and in the overwash phase of Tupelo silt loam, however, are sufficiently loamy to be fairly easily tilled. Most of the other soils need careful tillage because they puddle easily when plowed too wet and become cloddy. They require a great deal of power for tillage when too dry, and break into hard chunks that are difficult to work to a good seedbed. Because of slow internal drainage, these soils remain too wet to till for a considerable time following rains and are too cold and wet for early spring planting.

Improvement of the surface drainage by artificial means would improve tillage for many areas, especially on the Lawrence, Monongahela, Taft, and Tupelo soils. Better surface drainage for these soils, and additional organic matter for all except possibly the Hollywood soils, should increase productivity and the range of crops that can be grown. Since these soils have slowly permeable clayey subsoils, it is unlikely that tile drainage would improve them greatly.

These soils are fair to very good for pasture. All of them except perhaps the Hollywood soils need lime, substantial applications of fertilizer, and proper seeding in order to establish a good grazing cover. Fescue, orchardgrass, Dallisgrass, bluegrass, lespedeza, and whiteclovers are well suited to these soils.

Much of the Lawrence, Monongahela, and Taft acreage has favorable moisture for grazing vegetation during much of the drier part of the growing season. During extended dry periods, however, even these soils become rather droughty. The position and clayey texture of the Colbert, Dowellton, and Hollywood soils cause them to become droughty at an early stage in dry periods. Early spring grazing cannot be expected on any of these soils as a rule.

Management group 7

Soils of management group 7 (listed in table 16) are characterized by moderately friable surface soils and tight

TABLE 16.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 7, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates the crop specified is not commonly grown]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Colbert cherty silt loam, undulating phase	12	32	150	340	9	18	16	38	------	2. 4	0. 5	1. 0	60	120
Colbert cherty silty clay loam, eroded undulating phase	10	25	140	300	7	14	12	32	------	2. 2	. 4	. 9	50	110
Colbert fine sandy loam, eroded undulating phase	12	32	150	340	9	18	16	38	------	2. 4	. 5	1. 0	60	120
Colbert silt loam, undulating phase	15	35	160	340	10	20	18	40	------	2. 5	. 6	1. 0	70	130
Colbert silty clay loam, eroded undulating phase	12	32	150	330	9	18	16	38	1. 2	2. 4	. 5	1. 0	60	120
Pearman loam	20	42	200	420	14	22	25	46	1. 8	2. 9	. 7	1. 2	75	150
Talbott cherty silty clay loam, eroded undulating phase	16	36	220	370	14	20	25	42	1. 6	2. 4	. 5	1. 1	60	130
Talbott fine sandy loam, eroded undulating phase	20	40	250	420	16	22	28	47	1. 9	2. 7	. 6	1. 2	75	150
Talbott silty clay loam, eroded undulating phase	18	38	240	410	15	21	27	45	1. 8	2. 6	. 6	1. 2	70	145

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture

clayey subsoils. Their surface layers and upper subsoils are well drained to moderately well drained; their lower subsoils and parent materials are moderately well drained to somewhat poorly drained. Depth to bedrock ranges from less than 2 feet to about 6. Bedrock outcrops in places, and large boulders occur, particularly in the Colbert soils. The surface texture ranges from silty clay loam to fine sandy loam.

The Colbert and Talbott soils were derived from clayey limestone and clayey cherty limestone. The Pearman soil was derived from interbedded shale, sandstone, and limestone. The materials derived from shale are predominant. The surface soils and upper subsoils in some areas, however, contain considerable material from sandstone and are rather friable.

The soils of this group occupy positions on undulating uplands. Relief ranges from less than 2 to 6 percent. These soils cover less than 2 percent of the county. Much of the acreage occurs in the southern and southeastern parts and on valley slopes below and adjacent to steep mountain slopes.

The natural fertility is moderate, and the content of organic matter is low. The soils are medium to strongly acid. The uneroded or very slightly eroded areas are moderately easy to work, but the surface soils generally are shallow over tight clayey subsoils and are very erodible. As a result erosion has greatly impaired workability and tilth over considerable areas of these soils. The tilth in most places is fairly good but is not so favorable as that commonly found in the soils of groups 2, 3, and 4. Moisture absorption is rather slow, particularly in the eroded soils. Therefore the capacity for holding moisture available to plants is restricted and most areas are droughty during dry periods. Also, the slowly permeable subsoils cause runoff to develop quickly during rains.

Use and management.—Much of the acreage of the soils of this group has been cleared and is now cropped or pastured. Some of the land is idle part of the time. Cotton, corn, lespedeza, grain sorghum, soybeans, and field peas are among the most commonly grown crops. Moderate amounts of mixed fertilizer are commonly applied to the row crops, and much of the acreage has been limed. In general, organic matter and supplies of plant nutrients are far below what is needed for high crop yields.

These are fair to good crop soils and fair to very good pasture soils. They are suited to a number of general farm crops, including sericea lespedeza, alfalfa, and cotton. Their very firm clayey subsoils and rather heavy surface soils make them poorly suited to root crops such as potatoes and to most other truck crops. They need approximately a 4-year rotation in order to maintain productivity.

If these soils are cropped, a luxuriant vegetative cover should be maintained as much of the time as possible; where row crops are grown, it is well to follow them with a winter cover crop. Small grains and the more desirable legumes and grasses for hay and pasture are among the best suited crops for these soils.

These soils need organic matter, substantial amounts of fertilizer, and lime if they are to be kept productive. The organic matter would improve the tilth of the plow layer and increase moisture-holding capacity. Alfalfa will need boron. The soils are better suited to sericea lespedeza or to other legumes, however, than to alfalfa. These soils should not be worked when too wet or too dry; they are easily puddled when wet, and break into hard clods when worked dry. A great deal of power is needed to till these soils.

There is enough slope on much of the acreage of these soils to justify contour farming. Few areas are suited to terracing, as the very plastic clay subsoil would be exposed. Furthermore, bedrock is so shallow in some areas that it would interfere with the construction of terraces and with subsequent cultivation.

Practically all of these soils are productive of the more desirable legumes and grasses for pasture if adequately fertilized, limed, and seeded. Most areas used for pasture have a vegetative cover consisting of lespedeza and a variable amount of native grasses intermixed. The capacity of the soils of this group to hold moisture available to plants is much lower than for some of the more permeable friable soils, and grazing periods are somewhat more restricted. Periodic mowing of well-established vegetation will help to maintain the quality and grazing capacity of the pastures.

Management group 8

Soils of management group 8 (listed in table 17) are characterized by a reddish color, good drainage, and a rolling surface. They have moderately firm subsoils and are deep to bedrock. They cover about 2½ percent of the county and are widely distributed throughout the southern and central parts.

All of these soils have moderately high fertility and a moderate content of organic matter. Predominantly they are medium to strongly acid. Tilth of the plow layer ranges from fair on the more eroded areas to good on those less eroded. On the whole, except for the more severely eroded patches, these soils have a moderately high capacity for holding moisture available to plants. The severely eroded patches have a restricted moisture supply and are rather droughty during the extended dry periods.

Use and management.—Much of the acreage of the soils of this group is now cropped. Cotton is predominant, but a large acreage is in corn and hay, and some is in small grains, grain sorghum, and field peas. Row crops are grown for several years in succession on some areas, but rotations are used on part of the acreage.

Much of the land has been limed at some time during the past 15 years. Row crops, chiefly cotton, receive moderately heavy applications of mixed fertilizers. Fertility and organic-matter content, however, are generally not maintained at a high level, and runoff water is not controlled adequately on much of the land. Some farmers, in contrast, practice a system of management that checks erosion to a great extent and maintains a moderately high fertility level.

The soils of this management group are suited to a great number of general farm crops, including cotton, sericea lespedeza, and alfalfa. Their moderately strong slope and rather firm consistence make them much less suitable for truck crops, and especially for root crops, than the smoother, more friable soils. Under good management they can be expected to produce good yields of cotton, corn, soybeans, grain sorghum, small grains, and many of the more desirable legumes and grasses for hay and pasture. Their moderately strong slope makes them poorly suited to intensive use for row crops. To maintain them properly requires a 4- to 5-year rotation consisting of a row crop 1 year, a small grain 1 year, and a legume-and-grass mixture for hay or pasture 2 or 3 years.

TABLE 17.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 8, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cow-acre-days*[1]
Cookeville silt loam, eroded rolling phase	23	48	300	490	14	20	24	48	2.0	3.1	0.5	1.3	65	115	70	150
Cumberland loam, eroded rolling phase	23	48	310	500	15	23	27	50	2.4	3.2	.6	1.4	65	115	75	155
Decatur and Cumberland silty clay loams, eroded rolling phases	23	48	310	510	15	23	27	50	2.4	3.2	.7	1.5	65	110	80	165
Etowah silty clay loam, eroded rolling phase	22	50	300	490	14	21	24	48	2.2	3.1	.6	1.4	65	110	75	155
Hermitage silt loam, eroded rolling phase	23	48	310	510	14	22	27	48	2.3	3.0	.7	1.4	65	110	80	165

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

Winter cover crops that follow row crops are of great value in restraining runoff water during the winter.

Although these are among the stronger soils of the county, they respond well to proper fertilization and additions of lime and organic matter. Boron must be applied at regular intervals in order to maintain good stands of alfalfa. Contour farming is needed because of the moderately strong slope. In places terracing may be a practical means of controlling runoff water. Stripcropping may be practical on the longer slopes. These soils should be tilled when moisture is favorable in order to conserve good structure.

All of these soils are well suited to the more desirable legumes and grasses for pasture, and a great part of the acreage on many farms can best be kept in pasture. In order to establish and maintain a good grazing cover, however, all these soils need fertilizer, lime, and seeding with the more desirable legumes and grasses. Sericea lespedeza alone, or Ladino clover or other whiteclovers combined with orchardgrass and Dallisgrass, are suitable for seeding.

Management group 9

The soils of management group 9 (listed in table 18) are well-drained to moderately well drained. Their relief is rolling. They have developed over cherty limestone and have a slowly permeable layer at a depth of about 24 inches. Much of their acreage is sufficiently cherty to interfere considerably with tillage.

These soils cover approximately 5 percent of the county. Compared with the soils of group 8, these are lower in fertility and have a smaller supply of organic matter, somewhat slower internal drainage, and enough chert to interfere with cultivation.

Use and management.—About 10 percent of the acreage of this group is still under cutover native deciduous forest. The rest has been cleared, and much of it is now being cropped or pastured, although small areas lie idle for a

TABLE 18.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 9, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates the crop specified is not commonly grown]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days*[1]	*Cou-acre-days*[1]
Baxter cherty silt loam:																
Eroded rolling phase	20	38	290	480	13	18	25	46		2.8	.5	1.2	65	110	60	140
Rolling phase	20	40	300	500	14	19	25	48		2.8	.5	1.3	65	110	65	145
Dewey cherty silty clay loam, eroded rolling phase	21	44	300	490	14	20	25	48	2.0	3.0	.6	1.3	70	110	65	150
Dickson cherty silt loam:																
Eroded rolling phase	17	36	280	450	11	16	22	42		2.5	.5	1.2	60	110	60	130
Rolling phase	18	37	300	460	12	17	24	45		2.6	.5	1.3	65	110	60	135
Hermitage cherty silt loam:																
Eroded rolling phase	21	40	290	490	13	20	25	45	2.1	2.9	.6	1.3	60	100	65	145
Rolling phase	22	40	310	510	14	20	27	48	2.3	3.0	.7	1.4	65	110	68	148

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

TABLE 19.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 10, Madison County, Ala.*

[Yields in columns A are obtained under the prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates the crop specified is not commonly grown or the soil is not suited to its production]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Colbert cherty silty clay loam, eroded rolling phase	9	23	130	280	6	13	11	30	------	------	0. 3	0. 8	45	100
Colbert silty clay loam, eroded rolling phase	10	25	140	300	7	14	12	32	------	2. 2	. 4	. 9	50	100
Talbott cherty silty clay loam, eroded rolling phase	14	33	175	330	11	16	24	38	1. 5	2. 1	. 4	1. 0	60	125
Talbott fine sandy loam, eroded rolling phase	16	35	210	350	14	19	25	42	1. 6	2. 2	. 5	1. 1	65	130
Talbott silty clay loam, eroded rolling phase	15	34	200	340	13	18	23	40	1. 5	2. 1	. 4	1. 0	60	125

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

few years at a time. Cultivated areas are used for row crops about half the time. Cotton is the principal crop, but corn, small grains, and lespedeza for hay are also common. Some of the cleared acreage is in unimproved pasture.

Row crops, especially cotton, receive moderate applications of mixed fertilizer. Part of the acreage was limed at some time during the past 10 or 12 years. The organic-matter content of these soils is not well maintained. Yields are generally considerably below what can be expected under a high level of management.

These soils are suited to numerous general farm crops, including cotton, corn, small grains, and most of the legumes and grasses for hay and pasture. They are not well suited to alfalfa and truck crops. Chiefly because of their strong slope and somewhat low natural fertility, they are not well adapted to intensive use. If fertility is brought to a high level, they can be maintained under a 4- to 6-year rotation. A winter cover crop should follow row crops in order to check erosion by runoff water during the winter.

Heavy applications of fertilizer will be needed to produce high yields on these soils. The organic-matter content should be increased also. The more desirable legumes and grasses require lime. Although chert interferes with tillage, the soils have good tilth except in the more eroded areas where the plow layer consists predominantly of subsoil material.

Because of the moderately strong slopes and slow permeability in the siltpan of these soils, runoff is a greater problem than on less sloping, permeable soils. Tillage should therefore be on the contour and a close-growing vegetation should be maintained as long as practicable. Diversion ditches can be used to carry runoff water from areas where it has a tendency to accumulate in a volume large enough to be damaging. Stripcropping on the longer slopes will help to control runoff.

These soils are not naturally productive of the more desirable legumes and grasses for pasture. Where fertility is brought to a high level, lime added, and the area properly seeded, however, good stands of desirable grazing vegetation can be maintained.

Management group 10

The soils of management group 10 (listed in table 19) are characterized by very firm to extremely firm silty clay subsoils, moderately shallow depth to bedrock, and rolling relief. They are differentiated from the soils of group 7 mainly by their stronger slopes and by the more numerous eroded patches where the very firm subsoil is exposed. Some of these soils have enough chert in the plow layer to interfere considerably with tillage. The soils of this group make up only about 1 percent of the area of the county. They occur mainly in the southern and southeastern parts on gentle valley slopes below and adjacent to the steep mountain slopes.

These soils range from low to moderate in fertility and have a low organic-matter content. They are medium to strongly acid. Their very firm clayey subsoil and shallow depth to bedrock make them considerably more droughty than many of the deeper, more friable soils. They are moderately well drained to well drained, although their subsoils are slowly permeable to roots and moisture.

Tilth of the plow layer varies considerably. The Talbott soil has good tilth in less eroded areas or where the plow layer is still entirely within the sandy surface layer. The other soils, where severely eroded, have very poor tilth.

Use and management.—Only a small part of the acreage of the soils of this group is still under cutover native deciduous forest. The rest has been cleared, and much of it is pastured. Some areas lie idle for a number of years and are then put back into cultivation. Some have reverted to forest after having been brought to a low productive level by poor management.

Cotton, corn, and lespedeza for hay are the predominant crops, and yields are low to moderate. Row crops, especially cotton, receive moderate applications of fertilizer, and some of the acreage has been limed within the past 10 to 15 years. The organic-matter content has not been maintained well, and much of the acreage is not protected adequately from erosion by runoff.

The moderately strong slope, slow permeability, shallow depth to bedrock, and general droughtiness greatly limit the suitability of these soils for crops. Much of the

acreage can well be used for permanent pasture. Among the crops that are best suited to these soils are small grains and some of the more desirable legumes and grasses for hay. Corn, cotton, and grain sorghums are among the better suited row crops, but these cannot be grown at frequent intervals. The shallow depth to the firm clayey subsoils makes these soils poorly suited to truck and root crops. Rotations in which row crops are grown once in 4 to 7 years are necessary if the soils are to be kept reasonably productive.

The productivity of these soils is restricted principally by their limited capacity to supply water to plants. Substantial amounts of organic matter, at least moderate use of mixed fertilizer, and proper liming will improve productivity. Boron must be applied at regular intervals to maintain a vigorous stand of alfalfa. Sericea lespedeza appears to be more suitable for these soils, however, than alfalfa.

The heavy-textured plow layers of most of these soils require considerable power for tilling. The range of moisture under which they can be cultivated properly is very narrow. They puddle if tilled when too wet and develop into hard clods. They are very difficult to cultivate when too dry and will break into large hard fragments that are difficult to make into a good seedbed. Substantial applications of organic matter will help to improve the structure of the plow layer.

Tillage should be on the contour in order to control runoff. Terracing is not feasible because of the shallow depth to the very firm subsoil and to underlying bedrock. Moreover, many of the slopes are a little too steep for practical terracing. In some places diversion ditches can be used effectively to stop destructive accumulations of runoff.

These soils will produce desirable grazing vegetation if they are properly fertilized, limed, and seeded, and good stands are not difficult to maintain. Their limited capacity for holding moisture available to plants, however, shortens the time during which pasture growth is luxuriant. Nevertheless, well-established permanent pasture is the best use for much of these soils.

Management group 11

Soils of management group 11 (listed in table 20) are friable and permeable; they consist chiefly of material derived from sandstone. Except for the shallow phases of the Hartsells soils, which have an average depth to bedrock of less than 18 inches, all have good drainage and moderate depth to bedrock. The relief is rolling. Sandstone fragments in some of them interfere considerably with cultivation.

These soils cover less than 2 percent of the county. The Hartsells soils occur on the broader, smooth mountaintops, and the Allen and Jefferson soils on the valley slopes below and adjacent to the steep mountain slopes.

The plow layers are generally very friable. They have good tilth and are easy to work except where stone fragments interfere or some difficulty is experienced in manipulating heavy machinery on the moderately strong slopes. All of the soils are low in organic matter and plant nutrients and are medium to strongly acid. Their friable permeable texture is favorable for extended root growth. Except for the shallow phases of the Hartsells soils, the soils of this group have a moderate capacity for holding moisture available to plants.

Use and management.—A large part of the acreage of Allen and Jefferson soils in this management group has been cleared and is now cropped or pastured or is idle. Much of the Hartsells soils is also cleared, but an appreciable acreage is still under cutover native deciduous hardwood forest.

Cotton, corn, and lespedeza for hay are the chief crops. Small grains for winter cover are sown in the fall on part of the acreage. Some of the soils are planted to cotton for several years in succession; however, on about half of the tilled acreage, a rotation is used that consists of row crops and hay, chiefly lespedeza. Moderate to heavy applications of mixed fertilizer are applied for cotton. Some of the soils have been limed, but little has been done to maintain or to increase their organic matter.

Most of the pasture consists of a cover of lespedeza with some of the native grasses intermixed. As a rule

TABLE 20.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 11, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates crop specified is not commonly grown]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Potatoes		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Allen fine sandy loam, eroded rolling phase	23	48	300	490	15	20	25	48	2.0	3.1	0.5	1.3	75	110	70	150
Allen stony fine sandy loam, eroded rolling phase	21	43	280	480	13	20	23	44	1.9	3.0	.5	1.1	60	110	65	145
Hartsells fine sandy loam:																
Eroded rolling phase	24	46	330	540	12	20	27	45	-----	2.8	.7	1.2	130	185	45	135
Eroded rolling shallow phase	18	36	240	450	10	18	18	38	-----	2.5	.4	1.2	90	140	40	130
Rolling phase	25	47	330	550	12	20	27	45	-----	2.9	.7	1.3	135	190	45	140
Rolling shallow phase	20	38	250	480	10	18	18	40	-----	2.6	.5	1.2	95	145	40	130
Jefferson fine sandy loam, eroded rolling phase	22	42	300	500	14	19	24	46	1.6	2.7	.5	1.2	70	105	65	145
Jefferson stony fine sandy loam, eroded rolling phase	18	38	260	450	12	17	20	43	1.4	2.4	.5	1.1	60	100	60	140

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

the pasture is not of high quality, particularly on the Hartsells soils. Except for the acreage on Keel Mountain, most of the Hartsells soils in Madison County occur on relatively small sandstone plateaus, which are not readily accessible and are not sufficiently large to justify development into livestock farms.

The soils of this management group are fairly well suited to crops that require cultivation and to pasture. Suitable crops include cotton, corn, sericea lespedeza, alfalfa, and many of the truck crops. The productivity of these soils is somewhat restricted, however, by their limited capacity for holding moisture available to plants. Because of their fairly strong slope and active runoff on cultivated areas, these soils require moderately long rotations.

The soils respond well to proper fertilization. For good yields, most crops will need moderately heavy applications of complete fertilizer and organic matter. The more desirable legumes and grasses for hay and pasture will require lime. Alfalfa will need regular applications of boron in order to maintain a vigorous stand.

Good tilth is not difficult to maintain except on the more eroded areas. Even on these areas, tilth is not so unfavorable as that of some of the eroded soils developed over limestone. Tillage should be on the contour. Diversion ditches may be of value to remove runoff from areas where it tends to accumulate in large volume. Strip-cropping also may be practical for restraining runoff where the slope is sufficiently long to permit it. The strong slope and, in places, shallow depth to bedrock, make these soils poorly suited to terracing.

Although these soils are not particularly suitable for maintaining good stands of the more desirable legumes and grasses, productive pasture can be developed and maintained with proper fertilization, liming, and seeding. Sericea lespedeza is one of the most desirable pasture plants. Weedy growth and excess herbage should be removed by mowing in order to maintain vegetation of good quality.

Management group 12

The soils of management group 12 (listed in table 21) are alike in that they have lost all of their original surface soil as a result of erosion. Their plow layers now consist of subsoil material, which usually consists of very firm or compact clay that is low in organic matter.

These soils cover about 4 percent of the county. The separate tracts are not large and are rather widely distributed over the valley areas. They are usually associated with smoother less eroded soils of the uplands and stream terraces. The soils of this group have poor tilth, and generally their capacity for holding moisture available to plants is low. They are predominantly reddish in color and are medium to strongly acid. All except the Talbott cherty silty clay have a moderate depth to bedrock.

Small gullies are common on these soils but usually are not large enough to make cultivation impossible. The gullied phases of Decatur and Cumberland silty clays, however, have a rather intricate pattern of gullies, many of which cannot be crossed easily by heavy farm machinery.

Use and management.—All of these soils have been cleared and were cropped at some time. A part is cropped at the present time, but in general, yields are low. Some of the soils are in permanent pasture, but a large acreage is idle or is in unimproved pasture. Much of the acreage of the gullied phases of Decatur and Cumberland silty clays is idle. Small areas, however, have been smoothed by using heavy tillage implements and have been put

TABLE 21.—*Average acre yields of the principal crops, carrying capacity of pasture, and stand of forest to be expected over a period of years on the soils of management group 12, Madison County, Ala.*

[Yields in columns A are obtained under prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates the crop specified is not commonly grown]

Soil	Corn		Cotton (lint)		Wheat		Oats		Alfalfa hay		Lespedeza hay		Pasture		Pine forest
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]	
Allen clay loam, severely eroded rolling phase	10	30	150	350	6	18	12	30	1.2	2.0	0.3	0.7	40	130	Good.
Baxter cherty silty clay loam:															
Severely eroded rolling phase	10	28	140	330	5	17	10	27		2.0	.3	.7	35	120	Good.
Severely eroded undulating phase	12	30	150	350	5	18	10	28		2.0	.3	.7	40	125	Good.
Decatur and Cumberland silty clays:															
Gullied phases		30		360		18		30		2.0		.7		135	Very good.
Severely eroded rolling phases	13	30	160	360	6	18	12	30	1.2	2.0	.3	.7	50	135	Very good.
Severely eroded undulating phases	14	33	170	370	8	19	12	30	1.2	2.1	.3	.8	50	140	Excellent.
Dewey cherty silty clay:															
Severely eroded rolling phase	12	28	150	345	4	16	12	28	1.2	2.0	.3	.7	50	130	Very good.
Severely eroded undulating phase	13	32	160	360	5	18	11	28	1.1	2.0	.3	.7	45	130	Very good.
Hermitage cherty silty clay loam, severely eroded rolling phase	12	28	150	350	5	17	12	28	1.2	2.0	.3	.7	50	135	Good.
Talbott cherty silty clay, severely eroded rolling phase		25	140	300		15	7	22		1.5	.2	.6	25	110	Good.

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

back into use as improved permanent pasture. Some of the acreage of this group has been limed, but most of it has not been fertilized heavily. Organic-matter content is much lower than it originally was in these soils.

These soils vary in productivity but they are not well suited to crop production. The productivity of all of them, however, can be increased enough to make them useful for cultivation. The gullied phases of the Decatur and Cumberland silty clays will need more mechanical preparation than the other soils. Most of this gullied land can be reclaimed by smoothing with heavy tillage implements, but bulldozers may be needed for filling the larger gullies. The severely eroded rolling phases of the Baxter and Talbott soils will require the greatest effort to raise their fertility and organic-matter content. The severely eroded rolling phase of Allen clay loam should be the least difficult to rejuvenate, as it is the most friable of all of these soils.

Small grains and certain grasses and legumes, including sericea lespedeza and alfalfa for hay and pasture, are among the crops best suited to these soils. Most of the row crops, such as cotton, corn, soybeans, and grain sorghums, can be grown. The unfavorable tilth and the low capacity of these soils for holding moisture available to plants make row crops less profitable, as a rule, than close-growing crops.

The soils of this group require long rotations, as it is important to keep them in condition to restrain runoff water. Lime, heavy applications of fertilizer, and substantial additions of organic matter are necessary to raise productivity to a fairly high level. Boron will be required if alfalfa is to be grown.

The unfavorable tilth of these soils makes the use of heavy machinery necessary for preparing a good seedbed. Deep-rooted legumes and additional organic matter will help to improve tilth. Tillage should be on the contour. Diversion ditches may help prevent accumulations of runoff water. Most areas are too small to make stripcropping feasible. This practice should be used, however, on those areas associated with other soils that will benefit from it. Most of these severely eroded soils are too steep for practical terracing.

Much of the acreage of these soils can best be used for permanent pasture. Establishment of new pastures requires considerable care. The clayey texture of the seedbed makes moisture difficult to maintain during germination and early growth. Furthermore, this texture and the strong slopes make erosion a great hazard while the stand is being established. Adequate fertilizer, lime, and proper seeding are necessary. Sericea lespedeza grown alone is among the best pasture plants for these soils. Substantial additions of organic matter will help to get the pasture established. In some places, it may be advisable to keep the areas under a forest cover or a cover of kudzu over a long period before an attempt is made to establish a more desirable type of permanent pasture.

Management group 13

The soils of management group 13 (listed in table 22) have strong slopes that range from 12 to 25 percent. Their content of stone is usually large, and chert fragments are sometimes abundant. These soils have friable to firm permeable subsoils.

The Baxter and Bodine soils were derived from cherty limestone, the Talbott-Colbert cherty silty clay loams from clayey cherty limestone, the Allen and Hermitage soils from old colluvium, and the Muskingum soils from sandstone interbedded in places with shale. The thickness of the soil material over bedrock varies widely. In the Muskingum soils, it ranges from less than 1 foot to about 3 feet. In the Baxter soils, bedrock may be at a depth of more than 20 feet.

The soils of this group cover less than 2 percent of the county. The hilly phase of Muskingum fine sandy loam

TABLE 22.—*Average acre yields of the principal crops, carrying capacity of pasture, and stand of forest to be expected over a period of years on the soils of management group 13, Madison County, Ala.*

[Yields in columns A are those obtained under prevailing management; those in columns B are obtained under improved management. Absence of yield data indicates crop specified is not commonly grown or the soil is not suited to its production]

Soil	Corn		Cotton (lint)		Oats		Sericea lespedeza hay		Common lespedeza hay		Pasture		Pine forest
	A	B	A	B	A	B	A	B	A	B	A	B	
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]	
Allen stony fine sandy loam, eroded hilly phase	10	30	150	350	12	30	0.7	1.4	0.2	0.8	55	135	Good.
Baxter cherty silt loam:													
Eroded hilly phase	10	35	200	400	20	40	.7	1.4	.4	1.0	50	130	Good.
Hilly phase	12	36	220	400	15	35	.7	1.5	.3	.9	55	135	Good.
Baxter cherty silty clay loam, severely eroded hilly phase							.5	1.1	.3	.7	30	115	Good.
Bodine cherty silt loam:													
Eroded hilly phase	8	20	125	300	17	35	.4	1.0	.3	.8	20	100	Fair.
Hilly phase	8	20	125	300	10	30	.5	1.2	.4	.8	20	100	Fair.
Hermitage cherty silt loam, eroded hilly phase	14	32	170	360	12	30	.7	1.5	.4	1.0	60	145	Good.
Muskingum fine sandy loam, hilly phase	10	30	165	330			.8	1.6	.4	1.0	35	120	Good.
Talbott-Colbert cherty silty clay loams, eroded hilly phases							.4	1.0	.3	.7	50	115	Fair.

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

occurs on the stronger slopes of the mountaintops in association with the Hartsells soils. The Allen, Hermitage, and Talbott-Colbert soils occupy positions along the lower parts of the steep mountain slopes. The Baxter and Bodine soils are predominantly in the northwestern part of the county.

These soils range from moderate to low in fertility and are medium to strongly acid. The content of organic matter is generally low; it is considerably lower in cultivated than in uncultivated areas. The capacity for holding moisture available to plants is moderate to very low, and the more eroded slopes, especially those facing the south, are droughty.

Use and management.—Much of the Muskingum fine sandy loam, hilly phase, and part of the Bodine and Baxter soils, is still under cutover native deciduous forest. Most of the rest of the acreage in this management group has been cleared and cropped at some time. Much of it is now used for unimproved pasture or is reverting to forest. The tilled soils are planted chiefly to cotton, corn, and lespedeza for hay.

Some acreage has been limed, and some fertilizer is added to row crops, especially to cotton. Runoff water is usually not adequately controlled.

The strong slopes, stone content, and low fertility make these soils poorly suited to crops that require cultivation. A long rotation in which the soils are kept under close-growing vegetation much of the time should be used on areas that must be tilled. Tillage should be on the contour. In some areas diversion ditches will help prevent damaging accumulation of runoff water. Gully erosion is more of a hazard, especially on the Allen soil, than on soils having firmer, more clayey subsoils.

Most of the soils can well be seeded to permanent pasture. In developing good stands, however, it will be necessary to prepare the land carefully, apply adequate fertilizer and lime, and seed the soil properly to suitable legumes and grasses. Sericea lespedeza is one of the most desirable pasture plants. If fertility is brought to a high level, the soils are suitable for other desirable legumes and grasses. The north-facing slopes where the soil material is quite deep are the most favorable sites. These areas will supply much grazing vegetation if a good stand has been established. In the less favorable sites, especially on the south-facing slopes and where depth to bedrock is shallow, high productivity cannot be maintained throughout the drier months of the growing season.

Management group 14

The soils of management group 14 (listed in table 23) are poorly drained. They occupy low positions on the bottom lands and stream terraces and cover approximately 10 percent of the county. Except for Dunning silty clay, their surface soils are pale brown to gray, and their subsoils are gray mottled with yellow and brown. Dunning silty clay is darker in color and has a heavy plastic gray subsoil. It is a fertile soil and has a moderately high organic-matter content, whereas most of the other soils are low in fertility and organic matter. Except for the Dunning, Melvin, and Prader soils, these soils are medium to strongly acid.

Relief is nearly level; during wet periods the water table may be above the surface. The soils common to the bottom lands, such as Dunning, Lee, Melvin, and Prader, are subject to overflow. In general, the soils of the group hold an adequate supply of moisture available to plants throughout much of the growing season. The

TABLE 23.—*Average acre yields of the principal crops and carrying capacity of pasture to be expected over a period of years on the soils of management group 14, Madison County, Ala.*

[Yields in columns A are those obtained under prevailing management; those in columns B are obtained under improved management including adequate drainage. Absence of yield data indicates the crop specified is not commonly grown]

Soil	Corn		Lespedeza hay		Pasture	
	A	B	A	B	A	B
	Bu.	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Dunning silty clay	----	40	0. 7	1. 5	120	200
Guthrie silt loam	----	40	. 3	1. 1	40	175
Lee silt loam	----	50	. 7	1. 5	80	200
Lee-Lobelville silt loams	28	50	. 8	1. 6	100	200
Lee-Lobelville cherty silt loams	25	50	. 8	1. 5	90	185
Lickdale silt loam	----	40	. 3	1. 1	50	160
Melvin silty clay loam	----	55	. 7	1. 5	90	220
Prader fine sandy loam	----	50	. 6	1. 4	80	200
Robertsville silt loam	----	40	. 4	1. 4	60	180
Tyler very fine sandy loam	----	40	. 3	1. 2	40	180

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

Guthrie, Robertsville, and Tyler soils, however, generally dry out quickly and may be droughty during extended dry periods.

Use and management.—A considerable part of the soils of this management group has not been cleared, and the cleared areas are used largely for pasture. Corn,sorghums, and lespedeza for hay are the most common crops on the cultivated acreage, but yields in general are low and irregular. Little fertilizer is used. Most of the pasture vegetation consists of volunteer grasses, which are of low quality and have a low carrying capacity.

In their natural state, these soils are poorly suited to crops. They will support some pasture, however, especially if fertility is brought to a moderately high level and the areas are limed.

Artificial drainage is the chief requirement for making these soils more productive of crops. A considerable acreage can be improved greatly by surface drainage. Internal drainage systems, however, are apparently not feasible, as the subsoil in most of these soils is slowly permeable to water. The soils of this group are not subject to erosion and retain plant nutrients well. If enough fertilizer is used, they are suited to intensive use where adequately drained. Most areas will need moderately heavy amounts of fertilizer and lime. The Guthrie, Robertsville, and Tyler soils especially will respond noticeably to additions of organic matter.

Corn, soybeans, and sorghums are among the better suited row crops. The more friable soils are well suited to some truck crops. All of these soils, if adequately fertilized, should be productive of most of the more desirable legumes and grasses except alfalfa.

Areas to be cropped need careful tillage. Many of the soils puddle if tilled too wet; some of them, if tilled too dry, break into hard clods that are very difficult to work to a fine seedbed. The slow drainage causes these soils to be rather cold and delays suitable tillage conditions in

the spring or following heavy rains. In addition to drainage, protection against overflow may be practical on a few areas.

To increase pasture productivity on most areas surface drainage must be improved so that more desirable grazing plants can dominate. Fertilizer and proper seeding are needed on all of these soils to establish a good pasture stand, and lime is required on the Guthrie, Lee, Lickdale, Robertsville, and Tyler soils. The soils are suitable for a fescue and whiteclover mixture and also for orchardgrass, Dallisgrass, and bluegrass. These soils, under good management, are especially desirable for pasture during the drier parts of the growing season when many of the higher lying soils are inclined to be droughty.

Management group 15

The land types of management group 15 (listed in table 24) are too stony for tillage but they have enough soil material to support pasture. The soil material of Stony colluvium, Jefferson and Colbert soil materials, consists of a mixture of sandy and clayey materials. In contrast, that of the Stony rolling land, Talbott and Colbert soil materials, and Stony smooth land, Talbott and Colbert soil materials, is high in clay.

These land types cover less than 1 percent of the county. Most of the acreage occurs on valley floors at the base of the steep mountain slopes. The internal drainage is medium to slow, and usually the soil materials are moderately fertile. They are generally medium acid to neutral. Capacity for holding moisture available to plants varies somewhat; however, the capacity of the Stony rolling land, Talbott and Colbert soil materials, and the Stony smooth land, Talbott and Colbert soil materials, is restricted.

Use and management.—Some of the acreage of this group has been cleared and is now pastured. A considerable acreage is at least partly covered by forest. These land types afford some pasture, but part of the areas are too stony to be of much value for that purpose.

Response of this land to fertilizer varies greatly. The drier shallower areas cannot be expected to produce much pasture even under the best conditions. Those areas, however, where there is a considerable amount of soil material, can be made productive for pasture if adequately fertilized and limed, properly seeded, and protected against encroachment of brush and weeds. Many areas can best be used for forest, and cedars appear to be among the most suitable trees.

TABLE 24.—*Average carrying capacity of pasture to be expected over a period of years on the soils of management group 15, Madison County, Ala.*

[Yields in column A are obtained under prevailing management; those in column B are obtained under improved management]

Soil	Pasture	
	A	B
	Cow-acre-days [1]	*Cow-acre-days* [1]
Stony colluvium, Jefferson and Colbert soil materials	40	85
Stony rolling land, Talbott and Colbert soil materials	40	75
Stony smooth land, Talbott and Colbert soil materials	45	90

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

Management group 15a

The soils and land types of management group 15a (listed in table 25) are very poorly suited to crops or pasture. All of them are stony and shallow to bedrock; their relief is usually hilly to steep. Rockland, limestone, has no soil material; the others have so little that they are droughty and can support only a partial vegetative cover. The total acreage of this group makes up about 18 percent of the county; much of it occurs on the steep mountain slopes.

TABLE 25.—*Average carrying capacity of pasture and stands of forest to be expected over a period of years on the soils and land types of management group 15a, Madison County, Ala.*

[Yields in column A are obtained under prevailing management; those in column B are obtained under improved management. Absence of data indicates that the soil or land type is not suited to use specified]

Soil	Forest			Pasture	
	Redcedar	Hardwoods	Pine	A	B
				Cow-acre-days [1]	*Cow-acre-days* [1]
Bodine cherty silt loam, steep phase		Fair	Fair	30	90
Made land		Variable	Variable	Variable	Variable.
Muskingum stony fine sandy loam:					
Hilly phase		Fair	Good	25	80
Steep phase		Fair	Fair	20	50
Pits:					
Clay		Poor	Fair		
Gravel		Poor	Fair		
Rockland, limestone:					
Hilly	Good	Fair			
Rolling	Good	Fair		10	30
Steep	Fair	Fair			
Stony steep land, Muskingum soil material		Fair	Fair		

[1] The term "cow-acre-days" is used to express the number of days per year that 1 acre will graze 1 cow without injury to the pasture.

Use and management.—Most of the acreage is under cutover native deciduous forest. The productivity of forest is quite variable. Where there is a fair amount of soil material, especially on the north-facing slopes, a good stand of deciduous trees can be grown.

On the more stony sites, especially those facing to the south, forest growth is slow and of much less desirable quality. Most of this acreage can be managed by permitting revegetation, although planting may be practiced in a few places. In most areas, shortleaf and loblolly pines are best for planting. A few small areas have some pasture use, but usually the productivity of pasture vegetation will be low. In addition, enough vigorous grass growth will have to be maintained to protect the soil from erosion.

Additional Interpretive Soil Groupings

It will be easier to understand and use the soil map if the soils are grouped according to specific objectives. The grouping of soils according to management needs in the section Use and Management of Soils is an example of an interpretive grouping that will help those concerned with use and management problems. The soils can also be grouped in other ways; for example, according to lime requirements, fertility, drainage, slope, stoniness, or general suitability for crops.

Two classifications of the soils of Madison County should be of particular value. These are the capability groups of soils and the soil associations. These two groupings are discussed in the following pages.

Capability groups of soils

The capability grouping is an arrangement of soils to show suitability for crops, grazing, forestry, wildlife, or other uses, and the risks of erosion or other damage. It is widely used in helping farmers plan their practices for soil and water conservation.

Eight broad classes are provided in the capability arrangement although some of them do not occur in Madison County. Each soil is placed in one of these broad classes after joint study by several persons of the ways it responds when it is used.

Soils that are easy to farm and have no serious limitations for use are placed in capability class I. Such soils are not subject to more than slight erosion, drought, wetness, or other limitations and are at least fairly fertile. They are good for many uses. The farmer can use his class I soils for crops without special practices, other than those needed for good farming anywhere. He can choose one of several cropping patterns; or if he wishes he may use the soil for pasture, trees, or for other purposes.

Soils are placed in class II if they are a little less widely adaptable, and thus more limited than those in class I. For example, a gently sloping soil may have a slight erosion hazard that requires contour farming or other practices to control runoff. Other soils may be placed in class II because they are too droughty, too wet, or too shallow to be in class I. Climate can also be a limiting factor if too cool or too dry, but is not a limiting factor in the capability grouping for Madison County.

Class III contains the soils that are suitable for regular cropping but have more stringent management requirements than those in class II. The soils that are even more limited and have more narrow crop adaptations than those in class III, but are suitable for tillage part of the time, or with special precautions, are placed in class IV.

Soils not suitable for cultivation, or on which cultivation is not advisable, are in classes V, VI, VII, or VIII. Class V consists of soils not subject to erosion but unsuited to cultivation because of stoniness, standing water or frequency of overflow. Class VI contains the soils that are steep, droughty or shallow but will produce fairly good amounts of forage, orchard fruits, or forest products. As a rule class VI soils should not be cultivated, but some of them can safely be disturbed to prepare for planting trees or seeding long-producing forage crops.

Soils in class VII are more limited than those in class VI, require more care in handling, and usually give only fair to poor yields of forage or wood products. Class VIII consists of soils so severely limited that they produce little useful vegetation. They may provide attractive scenery or may be parts of valuable watersheds. Some may have value for wildlife.

Subclasses: Although the soils within a single capability class present use and management problems of about the same degree, the kinds of problems may differ greatly. These problems and limitations may be caused by erosion, designated by the symbol (e), excess water (w), shallowness, droughtiness, or low fertility (s).

Capability classes and subclasses in Madison County are given in the following list. The brief description of each subclass gives the general nature of most but not all of the soils included.

CLASS I.—Soils safe for use under intensive cultivation, without special practices to control runoff or erosion, and which may be expected to produce high yields with good soil and crop management. No subclasses are recognized in class I.

CLASS II.—Soils that can be used for tilled crops but under slight risks of erosion or other slight limitations.
- IIe: Undulating soils subject to erosion.
- IIw: Alluvial and colluvial soils affected by excess water.

CLASS III.—Soils that can be used for tilled crops, but under moderate risks of erosion or other moderate limitations.
- IIIe: Eroded undulating soils, rolling soils, and eroded rolling soils.
- IIIw: Soils moderately affected by excess water.

CLASS IV.—Soils that have severe limitations or high risks of soil damage when used for cultivation and when so used require special management.
- IVe: Hilly soils, eroded and severely eroded; undulating and rolling soils; and eroded hilly soils.
- IVw: Soils not well suited to crops because of excess water.

CLASS VI.—Soils too steep, or too sandy, for cultivation; suitable for pasture.
- VIe: Chiefly hilly, stony, or eroded soils and stony land.

CLASS VII.—Soils that are unsuitable for cultivation and usually produce only fair to poor amounts of forage or wood products; too droughty and erodible for cultivation and of low suitability for pasture.
- VIIe: Hilly, steep, and gullied soils, clay and gravel pits, and limestone rocklands.

The capability class and subclass for each soil are shown in the following list:

	Capability class and subclass
Abernathy cherty silt loam (AB)	I.
Abernathy fine sandy loam (AC)	I.
Abernathy silt loam (AD)	I.
Allen clay loam, severely eroded rolling phase (AL)	IVe.
Allen fine sandy loam:	
Undulating phase (AM)	IIe.
Eroded undulating phase (AN)	IIe.
Eroded rolling phase (AO)	IIIe.
Allen stony fine sandy loam:	
Eroded undulating phase (AP)	VIe.
Eroded rolling phase (AR)	VIe.
Eroded hilly phase (AS)	VIe.
Baxter cherty silt loam:	
Undulating phase (BA)	IIe.
Eroded undulating phase (BB)	IIe.
Rolling phase (BC)	IIIe
Eroded rolling phase (BD)	IIIe.
Hilly phase (BE)	IVe.
Eroded hilly phase (BF)	IVe.
Baxter cherty silty clay loam:	
Severely eroded undulating phase (BG)	IVe.
Severely eroded rolling phase (BH)	IVe.
Severely eroded hilly phase (BK)	VIIe.
Bodine cherty silt loam:	
Hilly phase (BN)	VIe.
Eroded hilly phase (BO)	VIe.
Steep phase (BP)	VIIe.
Bruno loamy fine sand (BR)	IIIe.
Captina and Capshaw loams, undulating phases (CA)	IIe.
Captina and Capshaw silt loams:	
Level phases (CB)	IIe.
Undulating phases (CC)	IIe.
Colbert cherty silt loam, undulating phase (CD)	IIIe.
Colbert cherty silty clay loam:	
Eroded undulating phase (CE)	IVe.
Eroded rolling phase (CF)	IVe.
Colbert fine sandy loam, eroded undulating phase (CG)	IIIe.
Colbert silt loam:	
Level phase (CH)	IVw.
Undulating phase (CK)	IIIe.
Colbert silty clay loam:	
Eroded undulating phase (CL)	IVe.
Eroded rolling phase (CM)	VIe.
Cookeville silt loam:	
Undulating phase (CO)	IIe.
Eroded undulating phase (CP)	IIe.
Eroded rolling phase (CR)	IIIe.
Cumberland loam:	
Undulating phase (CU)	IIe.
Eroded undulating phase (CV)	IIe.
Eroded rolling phase (CW)	IIIe.
Decatur and Cumberland silt loams:	
Level phases (DA)	I.
Undulating phases (DB)	IIe.
Decatur and Cumberland silty clays:	
Severely eroded undulating phases (DC)	IVe.
Severely eroded rolling phases (DD)	VIe.
Gullied phases (DE)	VIIe.
Decatur and Cumberland silty clay loams:	
Eroded undulating phases (DF)	IIIe.
Eroded rolling phases (DG)	IIIe.
Dewey cherty silty clay:	
Severely eroded undulating phase (DH)	IV.
Severely eroded rolling phase (DK)	VIe.
Dewey cherty silty clay loam:	
Eroded undulating phase (DL)	IIIe.
Eroded rolling phase (DM)	IIIe.
Dickson cherty silt loam:	
Undulating phase (DN)	IIe.
Eroded undulating phase (DO)	IIe.
Rolling phase (DP)	IIIe.
Eroded rolling phase (DR)	IIIe.
Dickson silt loam:	
Level phase (DS)	IIe.
Undulating phase (DT)	IIe.
Eroded undulating phase (DU)	IIe.
Dowellton silt loam (DV)	IVw.
Dunning silty clay (DW)	IIIw.
Egam silty clay loam (EG)	IIw.
Ennis silt loam (EN)	IIw.
Etowah cherty silt loam, undulating phase (ES)	IIe.
Etowah loam:	
Level phase (ET)	I.
Undulating phase (EU)	IIe.
Eroded undulating phase (EV)	IIe.
Etowah silt loam:	
Level phase (EW)	I.
Undulating phase (EX)	IIe.
Etowah silty clay loam:	
Eroded undulating phase (EY)	IIIe.
Eroded rolling phase (EZ)	IIIe.
Greendale cherty silt loam (GR)	IIe.
Greendale silt loam (GS)	IIe.
Guthrie silt loam (GU)	IVw.
Hamblen fine sandy loam (HA)	IIw.
Hartsells fine sandy loam:	
Undulating phase (HB)	IIe.
Eroded undulating phase (HC)	IIe.
Undulating shallow phase (HD)	IIIe.
Eroded undulating shallow phase (HE)	IVe.
Rolling phase (HF)	IIIe.
Eroded rolling phase (HG)	IIIe.
Rolling shallow phase (HH)	IVe.
Eroded rolling shallow phase (HI)	VIe.
Hermitage cherty silt loam:	
Eroded undulating phase (HJ)	IIe.
Rolling phase (HK)	IIIe.
Eroded rolling phase (HL)	IIIe.
Eroded hilly phase (HM)	IVe.
Hermitage cherty silty clay loam, severely eroded rolling phase (HN).	VIe.
Hermitage silt loam:	
Undulating phase (HO)	IIe.
Eroded undulating phase (HP)	IIe.
Eroded rolling phase (HQ)	IIIe.
Hollywood silty clay (HR)	IIIw.
Hollywood silty clay, eroded undulating phase (HS)	IIIw.
Holston fine sandy loam:	
Level phase (HT)	I.
Undulating phase (HU)	IIe.
Eroded undulating phase (HV)	IIe.
Humphreys cherty silt loam (HW)	IIe.
Humphreys silt loam (HX)	IIe.
Huntington fine sandy loam (HY)	IIw.
Huntington silt loam (HZ)	IIw.
Jefferson fine sandy loam:	
Undulating phase (JE)	IIe.
Eroded undulating phase (JF)	IIe.
Eroded rolling phase (JG)	IIIe.
Jefferson stony fine sandy loam, eroded rolling phase (JH)	VIe.
Lawrence silt loam (LA)	IIIw.
Lee silt loam (LE)	IIIw.
Lee-Lobelville cherty silt loams (LF)	IIIw.
Lee-Lobelville silt loams (LG)	IIIw.
Lickdale silt loam (LH)	IVw.
Lindside silty clay loam (LK)	IIw.
Linker fine sandy loam, eroded undulating phase (LL)	IIe.
Melvin silty clay loam (ME)	IIIw.
Monongahela fine sandy loam (MO)	IIe.
Muskingum fine sandy loam, hilly phase (MU)	VIe.
Muskingum stony fine sandy loam:	
Hilly phase (MV)	VIIe
Steep phase (MW)	VIIe.
Ooltewah fine sandy loam (OO)	IIw.
Ooltewah silt loam (OP)	IIw.
Pearman loam (PA)	IIIe.
Pits, clay (PC)	VIIe.
Pits, gravel (PG)	VIIe.
Prader fine sandy loam (PR)	IIIw.
Robertsville silt loam (RO)	IVw.
Rockland:	
Limestone, rolling (RP)	VIIe.
Limestone, hilly (RR)	VIIe.
Limestone, steep (RS)	VIIe.
Sequatchie fine sandy loam (SE)	I.
Sequatchie fine sandy loam, eroded phase (SF)	IIe.
Stony colluvium, Jefferson and Colbert soil materials (ST)	VIe.
Stony smooth land, Talbott and Colbert soil materials (SU)	VIe.
Stony rolling land, Talbott and Colbert soil materials (SV)	VIe.
Stony steep land, Muskingum soil material (SW)	VIIe.

	Capability class and subclass
Taft silt loam (TA)	IIIw.
Talbott cherty silty clay loam:	
Eroded undulating phase (TB)	IIIe.
Eroded rolling phase (TC)	IVe.
Talbott cherty silty clay, severely eroded rolling phase (TD)	VIe.
Talbott fine sandy loam:	
Eroded undulating phase (TE)	IIIe.
Eroded rolling phase (TF)	IVe.
Talbott silty clay loam:	
Eroded undulating phase (TG)	IVe.
Eroded rolling phase (TH)	IVe.
Talbott-Colbert cherty silty clay loams, eroded hilly phases (TK)	VIe.
Tupelo silt loam (TU)	IIIe.
Tupelo silt loam, overwash phase (TV)	IVw.
Tyler very fine sandy loam (TY)	IIIw.
Wolftever silt loam (WO)	IIe.
Wolftever silt loam, eroded phase (WP)	IIe.

Soil associations

Each soil not only occupies a characteristic position, such as on uplands, bottom lands, or stream terraces, but also occurs in characteristic geographic association with other soils. A soil association consists of a group of defined and named taxonomic soil units, regularly geographically associated in a defined proportional pattern (7). The association may consist of only a few soils or of many; the soils may be similar or they may be greatly different. Nine such associations are recognized in Madison County. Each of these is shown in a different color on the soil-association map in the back of this report.

Decatur-Cumberland-Abernathy soil association

This association is the most extensive in the county; it occupies approximately 28 percent of the area. It consists principally of well-drained, nearly level to rolling, red fertile soils that are deep to bedrock limestone. Decatur-Cumberland soils predominate. Extensive areas of Abernathy soils, however, occupy positions in the gentle depressions and sinks, and poorly drained Guthrie and Melvin soils occupy some low areas. Small patches of severely eroded Decatur-Cumberland and Cookeville soils also occur.

The most productive soils of the county are in this association. Soils well suited to crop production, make up approximately 80 percent of the acreage. These are predominantly smooth, well drained, fertile, and responsive to good management.

Much of the acreage of the association has been cleared and is cropped. The small amount of land that is not cleared consists mainly of poorly drained soils. Some small areas are so severely eroded that they are now lying idle or are reverting to forest. Cotton, which is fertilized heavily, is the chief crop, and corn is second in importance. Important but less extensive, are hay, small grains, and pasture. Yields are generally high.

Row crops are grown extensively; a large acreage is planted to them for many years in succession. Although cotton is the chief source of income, livestock has been increasing in recent years, and meat and dairy products are assuming importance. Much of the land is operated by tenants.

The Cumberland, Decatur, and other undulating and rolling soils are somewhat subject to erosion and need consistent fertilization. The soils of this association are generally strong, however, and suitable for moderately intensive use. They are suited to a fairly wide range in types of farming but are especially desirable for cotton and livestock. They usually need lime to grow the more desirable legumes and grasses. The soils of the uplands also need organic matter, phosphorus, and potassium if fertility is to be brought up to and kept at a high level.

Dickson-Lawrence soil association

The Dickson-Lawrence soil association occupies a smooth upland in the northwestern part of the county. It covers about 11 percent of the county. The soils range from moderately well drained to poorly drained. The poorly drained soils occupy about a fifth of the association acreage. Much of the land has a weak to moderate pan at depths that range from 20 to 30 inches.

These soils are lower in fertility than those of the Decatur-Cumberland-Abernathy association. Since the soils were less attractive as agricultural land, this section of the county was developed later than the areas in which the Decatur-Cumberland-Abernathy soil association is located. Most of the Dickson-Lawrence association consists of soils that are fair to good for the agriculture of the area.

In large part, the moderately well drained and somewhat poorly drained soils of this association have been cleared and cropped, but part is still under forest. Cotton is the chief crop, but some general farming is practiced in which corn, sorghum, and soybeans and various other legumes and grasses are grown for hay. Small amounts of truck crops are grown, including tomatoes, potatoes, cabbage, and greens. Much of the poorly drained acreage of the association is under cutover native deciduous forest.

A large number of the farms are tenant operated, although not so many as in the Decatur-Cumberland-Abernathy soil association.

If fertilized adequately and protected against loss from erosion, these soils are suited to moderately intensive use for farming. They are suitable for a fairly wide range of crops, including cotton, some truck crops, general field crops, and hay for livestock. They are also suitable for pasture.

Because of their somewhat slow drainage, the soils are generally colder and slower to warm in the spring than the predominant soils of the Decatur-Cumberland-Abernathy association. All need heavy applications of fertilizer; legumes and grasses need moderate amounts of lime. Much of the acreage can be improved for crop production by installing artificial drainage. Surface drains especially would be of benefit, as they would remove excess water more rapidly from the upper 12 to 18 inches of soil.

Hartsells-Muskingum soil association

The Hartsells-Muskingum is one of the least extensive of the soil associations in Madison County. It covers about 2 percent of the total area of the county. The soils occupy undulating to strongly rolling mountain ridgetops. The separate areas are irregular and small, and are isolated by the steep mountain slopes. The smoother parts consist chiefly of Hartsells soils, and the more sloping areas of shallow Muskingum soils.

The soils are sandy and are moderately shallow to sandstone bedrock. They are medium to strongly acid; fertility is low. The soils are well drained, however, and have exceptionally favorable tilth. They warm early in the spring so that they can be used for early planting.

Some of these soils have been cleared and are planted to crops such as cotton, corn, and some hay, chiefly lespedeza. A considerable acreage, however, is still under cutover native deciduous forest.

If fertilized adequately, the soils are suited to a number of crops. These include cotton, hay, soybeans, sorghums, and numerous truck crops such as potatoes, tomatoes, beans, and strawberries. They are not so well suited to sod as the soils of the Decatur-Cumberland-Abernathy soil association. Although all of these soils need heavy fertilization, the chief drawback to their development is the difficulty of access.

Allen-Jefferson soil association

The Allen-Jefferson association consists mainly of reddish or yellowish friable well-drained soils, which are generally undulating to rolling. The soils of this association cover approximately 5 percent of the area in the county. They occur on gentle valley slopes, mainly in belts at the base of the steep stony mountain slopes. One area, however, directly south of Huntsville along the northern border of the Tennessee River, is an old high stream terrace rather than a colluvial slope. Although a great part of the association consists of friable well-drained soils, some patches of more plastic soils, such as Colbert and Talbott, occur on the slopes, and somewhat poorly drained soils occur along some of the streams.

Much of the acreage consists of soils that are fair to good for the prevailing agriculture. These soils are not so fertile as those in the Decatur-Cumberland-Abernathy soil association. They are more friable and permeable, however, and therefore have better tilth and are suitable for field work and crops earlier in the spring.

Most of the acreage has been cleared and is now cropped or pastured. Some is idle, reverting to forest, or in unimproved pasture. Cotton is the principal crop, but corn and hay are important.

Holston-Tupelo-Robertsville soil association

The Holston-Tupelo-Robertsville soil association consists predominantly of nearly level poorly drained to somewhat poorly drained soils and of gently undulating moderately well drained soils. In addition to their rather wide range in drainage, the soils vary considerably in texture and permeability.

Soils of this association cover approximately 9 percent of the county. The largest area is in the extreme southeastern quarter. It consists of a low old general alluvial plain that is somewhat shallow to limestone bedrock.

About two-thirds of the association consists of soils fair to good for the agriculture of the area. The rest are poor for crops but fair to good for permanent pasture. The Holston and Sequatchie soils are well drained. They are permeable to roots and moisture to depths of 2 or 3 feet. Soils like the Tupelo and Monongahela, however, are somewhat slowly permeable and have heavy subsoils. The Colbert, Dowellton, and Hollywood soils are clayey and plastic throughout much of their profile, and the Tyler and Robertsville are poorly drained gray soils.

The soils of this association are well suited to general farming and cotton; they respond well to good management. They are somewhat lower in fertility and stronger in slope and receive more runoff from the adjacent steep slopes than soils of the Decatur-Cumberland-Abernathy soil association. The depth to limestone bedrock is also somewhat less, and as a result the soils are more subject to erosion damage. Furthermore, a considerable part of these soils is inadequately drained. Because of these unfavorable characteristics, productivity is more difficult to maintain than for soils of the Decatur-Cumberland-Abernathy soil association. The tilth and permeability, however, make a large part of the acreage suitable for crops that need intensive tillage and early spring growth.

Much of the better drained acreage has been cleared and is used for general farming in which cotton is the chief cash crop. The poorly drained areas are still largely under forest, although some have been cleared for pasture and some for crops.

The better drained, more friable soils are well suited to alfalfa and to tilled crops such as cotton and market vegetables. The soils that have poor drainage and heavier texture are fairly suitable for a limited variety of crops. The soils that are the most poorly drained and have the most plastic clayey texture are poorly suited to tilled crops. Much of this acreage, however, could be made productive of pasture grasses and legumes if artificial drainage were installed. A large part of the acreage of this association is suitable for general livestock farming. A cash crop, however, such as cotton or truck crops, should be grown as a supplementary source of income.

Hermitage-Talbott-Colbert soil association

Like those of the Allen-Jefferson association, the soils of the Hermitage-Talbott-Colbert association occupy positions on gentle valley slopes adjacent to steep stony mountain areas. They usually lie in strips at the base of these steep slopes and are widely distributed throughout the eastern half of the county. They cover about 7 percent of the total area.

These soils are distinguished from the Allen-Jefferson soils mainly by a finer, heavier texture and shallower depth to heavy plastic material and limestone bedrock. Although drainage is generally favorable for crops, the soils are more slowly permeable to roots and moisture than the predominant soils in the Allen-Jefferson soil association. They are somewhat more fertile, however, than the Allen-Jefferson soils and are better suited to grasses. The association consists mainly of soils fair to good for the agriculture of the area.

Most of these soils have been cleared and are now cropped or pastured. General farming predominates; cotton is an important cash crop.

The clayey texture, somewhat slow permeability, and shallow depth to bedrock make these soils less suitable for intensive cultivation than the soils of some of the other associations. They will support a good grass cover, so much of the acreage is therefore best used for livestock farming.

Baxter-Cookeville-Dewey soil association

This association consists mainly of red to light-red well-drained soils that are at least moderately deep to limestone bedrock. Relief is predominantly undulating or rolling. Some small patches, however, have stronger slopes. Although much of the acreage has chert in amounts that interfere materially with tillage, a considerable area is free of it. The soils are predominantly acid; they range in fertility from moderate to moderately high. Soils fair to good for tilled crops and good to excellent for pasture are dominant. Nevertheless, there is a fairly large acreage consisting of soils excellent for crops and pasture that are mixed with soils poor to fair for crops but

fair to good for pasture. Soils not well suited to tilled crops but fair for pasture are confined to the less extensive poorly drained areas and to those that are the most severely eroded and steeply sloping. Most of this association is in the northeastern quarter of the county. There is a notable acreage of some of its component soils, such as the Dewey, in other parts of the county. In these other parts they are in combination with other soils that give a different soil association.

Much of the acreage has been cleared and is now cropped or pastured. Cotton farms predominate; many of the farms are tenant operated. Row crops, especially cotton, receive moderately heavy applications of fertilizer. A considerable acreage of these soils, such as of the rolling phases, has been damaged considerably by erosion, and some of this acreage is either idle or is in unimproved pasture.

On the whole the soils of this association are well suited to farming. They need more careful management and heavier fertilization, however, than the Decatur-Cumberland-Abernathy soils, as their natural fertility is lower and their slopes steeper. They are well suited to general livestock farming in which a small acreage of cash crops is grown. They are not so well suited to truck crops as soils of some of the other associations, such as the Hartsells-Muskingum, Dickson-Lawrence, and parts of the Holston-Tupelo-Robertsville.

Huntington-Lindside-Hamblen soil association

The Huntington-Lindside-Hamblen soil association consists of nearly level, broad areas of bottom land along the larger creeks and rivers. The soils occupy about 10 percent of the total area of the county. The drainage ranges from poor to moderate, and much of the acreage is subject to overflow. The somewhat poorly drained, moderately well drained, and well-drained soils have fairly good tilth, but the tilth of the poorly drained soils is less favorable. The proportion of well-drained, somewhat poorly drained, and poorly drained soils varies greatly from place to place. In some areas, the poorly drained soils predominate; in others, the moderately well drained to well-drained soils make up a great part of the acreage.

Most areas of somewhat poorly drained, moderately well drained, and well drained soils have been cleared and are now used for row crops or pasture.

The poorly drained soils are still largely under cutover native deciduous forest. The acreage suited to crops is used intensively for row crops, of which corn is predominant.

The soils of this association, where drainage permits, are well suited to very intensive use. They are not subject to erosion and in large part are high in fertility. With moderate fertilization they can be kept highly productive. In many localities, the soils in this association are of high value for permanent pasture, as their favorable moisture makes grazing possible during the drier parts of the growing season.

Rough stony land soil association

Soils of the Rough stony land association occupy steep, stony mountain slopes. They are widely distributed throughout the eastern third of the county. They are shallow to bedrock, and many rock outcrops and loose stones occur. Sandstone underlies the upper fourth of the slopes, and in many places appears as precipitous slopes or cliffs. Limestone underlies the lower slopes. Soil and broken rock debris lie on the slopes that are underlain by limestone, especially along the upper edge. This debris has worked down from the adjacent higher slopes.

Practically all of the soils of this association are under cutover native deciduous forest. Because the land is so steep and stony, it is practically all unsuitable for crops or pasture. It will produce forest, but a large part is not easily accessible for this purpose.

Irrigation

In recent years irrigation has become increasingly important in this county. Several factors are responsible; the cost of overhead irrigation has decreased greatly; equipment to distribute the water is much more mobile than formerly; and experiments have proved that supplemental irrigation is practical.

Irrigation is still not of major importance, however, because it is needed only to supplement the natural sources of water for a part or parts of the growing season. Also it is possible on only a small part of the land. Furthermore, rainfall in approximately 1 year out of 5 is distributed over the growing season and is so nearly adequate as to make irrigation of little or no value. Moderate responses can be expected from irrigation in 2 or 3 years out of 5. In 1 to 2 years out of 5, however, decided responses can be expected if the water is supplied properly, and soil and plant conditions are favorable.

Both access to water and an adequate supply are limiting factors to consider when planning to install irrigation. It will not be feasible to deliver water a great distance from the source, nor to raise it a great height above the source. Although no definite limit can be set on the elevation to which it is practical to raise water for irrigation, as a rule it is not economical to raise it more than a hundred feet, even under the most favorable conditions.

The value of the crop, the cost of power and equipment, the size of the acreage, and the productivity of the soil are important factors to consider in deciding whether irrigation will be practical. The factors should also be considered in determining the distance that one can afford to transport the water. Usually it will not be profitable to conduct water more than a half mile; for a small acreage, this distance will be much less.

Only streams, lakes, and ponds that will supply water during the driest periods of the year are adequate sources. Many streams and ponds that appear to be good sources during the early part of the growing season may actually be dry when water is most needed for irrigation.

The kind of soil, although not so limiting as for surface or flood irrigation, is an important factor in determining whether irrigation will be feasible. The soils must be capable of giving a decided increase in yields when irrigated. Medium texture, good tilth, depth that is moderate or greater, good drainage, gentle slope, and at least a fair capacity for holding plant nutrients and moisture are among the most important characteristics of soils that are well suited to irrigation.

The soils of Madison County that are at least moderately well suited to irrigation are in management groups 1 to 10, inclusive, and in 12. (See section Use and Management of Soils.) The most desirable for irrigation are in groups 1 to 5, inclusive, with the exception of 1a; they meet the requirements stated above.

The soil in management group 1a, Bruno loamy fine sand, can be expected to respond well to irrigation if well managed. Its very sandy texture, however, will make

necessary great care to maintain optimum moisture and plant-nutrient balance.

The drainage in the soils of group 6 is somewhat impaired; most of these soils are low in plant nutrients. Only under unusual circumstances and with heavy fertilization can good response be expected from irrigation.

The content of clay is high in the soils of groups 7 and 8, and many of these soils are shallow to bedrock. Maintaining optimum moisture and good tilth is considerably more difficult than in the more friable loamy soils.

The surface of most of the soils in groups 9, 10, and 12 is rolling. This rolling surface makes it difficult to move equipment and to carry on other field work. In addition, if water is applied in excessive amounts, it is more likely to cause erosion. These soils have more of the clayey subsoil exposed. As a result, the plow layer has less favorable tilth and a lower capacity for holding moisture available to plants. Under good management, however, if additional moisture is needed, these soils should respond well to irrigation.

Much of the Hamblen, Lindside, and Ooltewah acreage retains moisture longer during dry periods than the higher, better drained soils of the uplands and therefore will not respond so well to irrigation. This is true to some degree also of the other soils in group 1 and those of group 3. The low position of these soils makes moisture somewhat more favorable than in the upland soils.

Irrigation is of greater value to some crops than to others. High-value crops, such as potatoes, beans, and strawberries, give a high return if water is applied during a drought that occurs at a critical stage in their development. Pasture in some years will benefit greatly from irrigation, both in yield and in palatability. All pasture plants, however, are not equally responsive. Bermudagrass and bluegrass are among those that are not so responsive; orchardgrass, whiteclover, lespedeza, fescue, and Dallisgrass are among the most responsive.

In many years yields of alfalfa hay will increase considerably if irrigation is used, because alfalfa needs considerable moisture during the driest part of the growing season. Late-season crops, such as corn and soybeans, will respond to irrigation in years when moisture is not sufficient during midsummer and late summer. Often irrigation of fall-sown small grains and other winter cover crops, such as crimson clover, is of considerable advantage. It gets the crops off to an early start and helps to establish a uniform stand.

You should get the help of an experienced engineer or soil conservationist before you decide to install an irrigation system on your farm.

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Soil	Map symbol	Management group [1]	Slope range	Natural drainage [2]	Permeability
			Percent		
Abernathy silt loam	Ad	1	0– 2	Good	Moderately rapid
Abernathy cherty silt loam	Ab	1	0– 2	Good	Moderately rapid
Abernathy fine sandy loam	Ac	1	0– 2	Good	Moderately rapid
Allen fine sandy loam, undulating phase	Am	4	2– 6	Good	Moderately rapid
Allen fine sandy loam, eroded undulating phase	An	4	2– 6	Good	Moderately rapid
Allen fine sandy loam, eroded rolling phase	Ao	11	6–12	Good	Moderately rapid
Allen clay loam, severely eroded rolling phase	Al	12	6–12	Good	Moderately rapid
Allen stony fine sandy loam, eroded undulating phase	Ap	4	2– 6	Good	Moderately rapid
Allen stony fine sandy loam, eroded rolling phase	Ar	11	6–12	Good	Moderately rapid
Allen stony fine sandy loam, eroded hilly phase	As	13	12–20	Good	Moderately rapid
Baxter cherty silt loam, undulating phase	Ba	3a	2– 6	Good	Moderate
Baxter cherty silt loam, eroded undulating phase	Bb	3a	2– 6	Good	Moderate
Baxter cherty silty clay loam, severely eroded undulating phase.	Bg	12	2– 6	Good	Moderate
Baxter cherty silt loam, rolling phase	Bc	9	6–12	Good	Moderate
Baxter cherty silt loam, eroded rolling phase	Bd	9	6–12	Good	Moderate
Baxter cherty silty clay loam, severely eroded rolling phase.	Bh	12	6–12	Good	Moderate to slow
Baxter cherty silt loam, hilly phase	Be	13	12–20	Good	Moderate
Baxter cherty silt loam, eroded hilly phase	Bf	13	12–20	Good	Moderate
Baxter cherty silty clay loam, severely eroded hilly phase.	Bk	13	12–20	Good	Slow
Bodine cherty silt loam, hilly phase	Bn	13	12–20	Somewhat excessive	Moderately rapid
Bodine cherty silt loam, eroded hilly phase	Bo	13	12–20	Somewhat excessive	Moderately rapid
Bodine cherty silt loam, steep phase	Bp	15a	20–60	Somewhat excessive	Moderately rapid
Bruno loamy fine sand	Br	1a	0– 3	Excessive	Very rapid
Captina and Capshaw silt loams, undulating phases	Cc	5	2– 6	Moderately good	Moderately slow
Captina and Capshaw silt loams, level phases	Cb	5	0– 2	Moderately good	Moderately slow
Captina and Capshaw loams, undulating phases	Ca	5	2– 6	Moderately good	Moderately slow
Colbert silt loam, undulating phase	Ck	7	2– 6	Moderately good	Slow
Colbert silty clay loam, eroded undulating phase	Cl	7	2– 6	Moderately good	Slow
Colbert silty clay loam, eroded rolling phase	Cm	10	6–12	Good	Slow
Colbert silt loam, level phase	Ch	6	0– 2	Moderately good	Slow
Colbert cherty silt loam, undulating phase	Cd	7	2– 6	Moderately good	Slow
Colbert cherty silty clay loam, eroded undulating phase	Ce	7	2– 6	Moderately good	Slow
Colbert cherty silty clay loam, eroded rolling phase	Cf	10	6–12	Good	Slow
Colbert fine sandy loam, eroded undulating phase	Cg	7	2– 6	Moderately good	Slow
Cookeville silt loam, undulating phase	Co	3	2– 6	Good	Moderate
Cookeville silt loam, eroded undulating phase	Cp	3	2– 6	Good	Moderate
Cookeville silt loam, eroded rolling phase	Cr	8	6–12	Good	Moderate
Cumberland loam, undulating phase	Cu	3	2– 6	Good	Moderate
Cumberland loam, eroded undulating phase	Cv	3	2– 6	Good	Moderate
Cumberland loam, eroded rolling phase	Cw	8	6–12	Good	Moderate
Decatur and Cumberland silt loams, undulating phases	Db	3	2– 6	Good	Moderate
Decatur and Cumberland silty clay loams, eroded undulating phases.	Df	3	2– 6	Good	Moderate
Decatur and Cumberland silty clays, severely eroded undulating phases.	Dc	12	2– 6	Good	Moderate
Decatur and Cumberland silt loams, level phases	Da	3	0– 2	Good	Moderate
Decatur and Cumberland silty clay loams, eroded rolling phases.	Dg	8	6–12	Good	Moderate
Decatur and Cumberland silty clays, severely eroded rolling phases.	Dd	12	6–12	Good	Moderate

See footnotes at end of table.

showing the important characteristics of the soils

Surface soil color [3] [4]	Subsoil		Depth [5]	Parent rock or parent material
	Color [3]	Consistence [3]		
			Feet	
Brown to dark reddish brown.	Dark reddish brown to brownish red.	Friable	8+	Local alluvium originating from high-grade limestone.
Same	Same	Friable	8+	Local alluvium originating from high-grade cherty limestone.
Grayish brown to reddish brown.	Grayish brown to reddish brown.	Friable	8+	Local alluvium originating chiefly from high-grade limestone.
Same	Reddish brown to yellowish red.	Friable to firm	3–8	Old mixed colluvium from sandstone, shale, and some limestone.
Reddish brown	Same	Friable to firm	2½–8	Same.
Reddish brown	Same	Firm	2–7	Same.
Reddish brown	Same	Friable to firm	1½–6	Same.
Reddish brown	Same	Friable to firm	2½–8	Same.
Reddish brown	Same	Friable to firm	2–7	Same.
Reddish brown	Same	Friable to firm	1½–6	Same.
Grayish brown	Yellowish red mottled in lower part.	Firm	2–5	Cherty limestone.
Brownish yellow or reddish yellow.	Same	Firm	3–5	Cherty limestone.
Yellowish red	Same	Very firm	3–5	Cherty limestone.
Grayish brown	Same	Firm	2–4	Cherty limestone.
Brownish yellow or reddish yellow.	Same	Firm	2–4	Cherty limestone.
Yellowish red	Same	Firm	2–4	Cherty limestone.
Grayish brown	Same	Firm	2–4	Cherty limestone.
Brownish yellow to yellowish red.	Same	Firm	2–4	Cherty limestone.
Yellowish red	Yellowish red mottled in lower part.	Firm	1–3	Cherty limestone.
Pale brown to grayish brown	Brownish-yellow clayey cherty matrix.	Firm	1½–3	Very cherty limestone.
Pale yellow	Same	Firm	1½–3	Very cherty limestone.
Pale brown to grayish brown	Same	Firm	½–2	Very cherty limestone.
Very pale brown to brownish yellow.	Pale yellow	Loose	6+	Young general alluvium chiefly from sandstone.
Pale yellow	Light yellowish brown to yellowish brown grading to mottled in lower part.	Friable to firm	4–15	Old general alluvium chiefly from limestone; some shale and sandstone.
Pale yellow	Same	Friable to firm	4–15	Same.
Pale yellow	Same	Friable to firm	4–15	Same.
Light yellowish brown	Brownish yellow grading to mottled.	Very firm	1½–4	Clayey or argillaceous limestone.
Brownish yellow	Same	Very firm	1–3	Same.
Brownish yellow	Same	Very firm	½–2½	Same.
Gray to pale yellow	Yellow, faintly mottled	Very firm	2–4	Same.
Light yellowish brown	Brownish yellow grading to mottled.	Very firm	2½–5	Cherty clayey limestone.
Brownish yellow	Brownish yellow to yellowish brown.	Very firm	2–4	Cherty clayey limestone.
Light yellowish brown	Brownish yellow grading to mottled.	Very firm	1½–3½	Cherty clayey limestone.
Gray to pale yellow	Yellow grading to mottled	Very firm	2–3½	Thin alluvium over clayey limestone residuum.
Pale brown	Yellowish red	Firm	5–8	Cherty limestone.
Pale brown to brown	Yellowish red	Firm	5–8	Cherty limestone.
Pale brown to reddish yellow.	Yellowish red	Firm	8–35	Cherty limestone.
Grayish brown to dark brown.	Dark reddish brown to dark red.	Moderately firm	4–20	Old general alluvium, chiefly limestone; some shale and sandstone.
Brownish red	Same	Firm	4–15	Same.
Brownish red	Same	Firm	4–15	Same.
Dark brown to dark reddish brown.	Same	Firm	5–20	High-grade limestone and old general alluvium chiefly from limestone.
Brownish red	Same	Firm to very firm	5–20	Same.
Dark reddish brown to red	Same	Same	3½–20	Same.
Dark brown to dark reddish brown.	Same	Firm	5–20	Same.
Brownish red	Same	Firm to very firm	4–16	Same.
Dark reddish brown to red	Same	Firm to very firm	3–15	Same.

Soil	Map symbol	Management group [1]	Slope range	Natural drainage [2]	Permeability
			Percent		
Decatur and Cumberland silty clays, gullied phases	DE	12	6–25	Good	Moderate
Dewey cherty silty clay loam, eroded undulating phase	DL	3a	2– 6	Good	Moderate
Dewey cherty silty clay, severely eroded undulating phase.	DH	12	2– 6	Good	Moderate
Dewey cherty silty clay loam, eroded rolling phase	DM	9	6–12	Good	Moderate
Dewey cherty silty clay, severely eroded rolling phase	DK	12	6–12	Good	Moderate
Dickson silt loam, undulating phase	DT	5	2– 6	Moderately good	Moderately slow
Dickson silt loam, eroded undulating phase	DU	5	2– 6	Moderately good	Moderately slow
Dickson silt loam, level phase	DS	5	0– 2	Moderately good	Moderately slow
Dickson cherty silt loam, undulating phase	DN	5	2– 6	Moderately good	Moderately slow
Dickson cherty silt loam, eroded undulating phase	DO	5	2– 6	Moderately good	Moderately slow
Dickson cherty silt loam, rolling phase	DP	9	6–12	Moderately good	Moderately slow
Dickson cherty silt loam, eroded rolling phase	DR	9	6–12	Moderately good	Moderately slow
Dowellton silt loam	DV	6	0– 3	Poor	Very slow
Dunning silty clay	DW	14	0– 2	Poor	Very slow
Egam silty clay loam	EG	1	0– 2	Moderately good	Moderately slow
Ennis silt loam	EN	1	0– 2	Good	Moderately rapid
Etowah silt loam, undulating phase	EX	2	2– 6	Good	Moderately rapid
Etowah silty clay loam, eroded undulating phase	EY	2	2– 6	Good	Moderately rapid
Etowah silt loam, level phase	EW	2	0– 2	Good	Moderately rapid
Etowah silty clay loam, eroded rolling phase	EZ	8	6–12	Good	Moderately rapid
Etowah cherty silt loam, undulating phase	ES	3a	0– 6	Good	Moderately rapid
Etowah loam, undulating phase	EU	2	2– 6	Good	Moderately rapid
Etowah loam, eroded undulating phase	EV	2	2– 6	Good	Moderately rapid
Etowah loam, level phase	ET	2	0– 2	Good	Moderately rapid
Greendale silt loam	GS	2	0– 5	Good	Moderately rapid
Greendale cherty silt loam	GR	2	0– 5	Good	Moderately rapid
Guthrie silt loam	GU	14	0– 2	Poor	Very slow
Hamblen fine sandy loam	HA	1	0– 2	Somewhat poor	Moderately rapid
Hartsells fine sandy loam, undulating phase	HB	4	2– 5	Good	Moderately rapid
Hartsells fine sandy loam, eroded undulating phase	HC	4	2– 5	Somewhat excessive	Moderately rapid
Hartsells fine sandy loam, rolling phase	HF	11	5–10	Somewhat excessive	Moderately rapid
Hartsells fine sandy loam, eroded rolling phase	HG	11	5–10	Somewhat excessive	Moderately rapid
Hartsells fine sandy loam, undulating shallow phase	HD	4	2– 5	Somewhat excessive	Moderately rapid
Hartsells fine sandy loam, eroded undulating shallow phase.	HE	4	2– 5	Somewhat excessive	Moderately rapid
Hartsells fine sandy loam, rolling shallow phase	HH	11	5–10	Somewhat excessive	Moderately rapid
Hartsells fine sandy loam, eroded rolling shallow phase	HI	11	5–10	Somewhat excessive	Moderately rapid
Hermitage silt loam, undulating phase	HO	3	2– 6	Good	Moderate
Hermitage silt loam, eroded undulating phase	HP	3	2– 6	Good	Moderate
Hermitage silt loam, eroded rolling phase	HQ	8	6–12	Good	Moderate
Hermitage cherty silt loam, eroded undulating phase	HJ	3a	2– 6	Good	Moderate
Hermitage cherty silt loam, rolling phase	HK	9	6–12	Good	Moderate
Hermitage cherty silt loam, eroded rolling phase	HL	9	6–12	Good	Moderate
Hermitage cherty silty clay loam, severely eroded rolling phase.	HN	12	6–12	Good	Slow
Hermitage cherty silt loam, eroded hilly phase	HM	13	12–25	Good	Moderate

See footnotes at end of table.

the important characteristics of the soils—Continued

Surface soil color [3 4]	Subsoil		Depth [5]	Parent rock or parent material
	Color [3]	Consistence [3]		
			Feet	
Same	Same	Firm to very firm	3–14	Same.
Brown to reddish brown	Yellowish red to brownish red.	Firm	8–20	High-grade cherty limestone.
Yellowish red to brownish red.	Mottled yellowish red to brownish red.	Firm	7–18	Same.
Brown to reddish brown	Yellowish red to brownish red.	Firm	7–18	Same.
Yellowish red to brownish red.	Same	Firm	6–15	Same.
Light brownish gray to yellowish brown.	Yellowish brown grading to mottled.	Friable to moderately firm.	5– 8	Cherty limestone.
Light yellowish brown	Yellowish brown to brownish yellow.	Friable to moderately firm.	5– 8	Cherty limestone.
Light brownish gray to yellowish brown.	Same	Friable to moderately firm.	5– 8	Cherty limestone.
Same	Same	Friable to moderately firm.	4– 6	Cherty limestone.
Light brownish gray to light yellowish brown.	Same	Friable to moderately firm.	4– 6	Cherty limestone.
Light brownish gray	Same	Friable to moderately firm.	3– 6	Cherty limestone.
Light yellowish brown	Same	Friable to moderately firm.	3– 6	Cherty limestone.
Grayish brown	Gray, mottled	Extremely firm	3– 7	Clayey limestone.
Very dark grayish brown, faintly mottled.	Very dark gray or dark olive gray, mottled.	Very firm	5+	General alluvium from clayey limestone.
Dark brown to very dark grayish brown.	Dark yellowish brown	Same	6+	Mixed general alluvium chiefly from limestone.
Dark yellowish brown	Brown to dark yellowish brown.	Friable	3½–10	Mixed general alluvium chiefly from cherty limestone.
Brown to reddish brown	Yellowish red	Friable but firm	4–20	Mixed general alluvium, chiefly limestone.
Brown	Yellowish red	Firm	4–20	Same.
Brown to yellowish brown	Brown to dark yellowish brown.	Firm but friable	4–20	Same.
Yellowish brown	Yellowish brown to yellowish red.	Firm	3–18	Same.
Brown to reddish brown	Yellowish red	Moderately firm	4–20	Mixed general alluvium, chiefly limestone.
Grayish brown or brown	Yellowish red to reddish brown.	Firm but moderately friable.	4–20	Same.
Same	Yellowish red	Firm	4–20	Same.
Grayish brown	Yellowish brown	Firm	4–20	Same.
Light yellowish brown or pale brown.	Yellowish brown	Very friable	7–25	Local alluvium, chiefly from cherty limestone.
Pale brown to yellowish brown.	Yellowish brown	Friable but somewhat firm.	7–25	Same.
Light gray	Gray, mottled	Very firm	5–20	Local alluvium from limestone.
Light grayish brown	Faintly mottled pale brown, yellowish brown, and yellowish red.	Friable	4–20	Young mixed general alluvium from sandstone, limestone, and shale
Light yellowish brown	Yellowish brown	Friable	2–4	Sandstone.
Light yellowish brown	Yellowish brown	Friable	1½–3½	Sandstone.
Light yellowish brown	Yellowish brown	Friable	1½–3	Sandstone.
Light yellowish brown	Yellowish brown	Friable	1–3	Sandstone.
Light yellowish brown	Yellowish brown	Friable	1–2½	Sandstone.
Light yellowish brown	Yellowish brown	Friable	1–2½	Sandstone.
Light yellowish brown	Yellowish brown	Friable	1–2	Sandstone.
Light yellowish brown to yellowish brown.	Yellowish brown	Friable	½–2	Sandstone.
Grayish brown to brown	Yellowish red	Firm	4–10	Old colluvium or local alluvium from limestone.
Brown to reddish brown	Yellowish red	Firm	4–10	Same.
Same	Yellowish red	Firm	3– 8	Same.
Grayish brown to reddish brown.	Yellowish red	Firm	4–10	Old colluvium or local alluvium from cherty medium grade limestone.
Grayish brown	Yellowish red	Firm	3– 8	Same.
Grayish brown to reddish brown.	Yellowish red	Firm	3– 8	Same.
Yellowish red	Yellowish red	Firm to very firm	2½– 6	Same.
Grayish brown to reddish brown.	Yellowish red	Firm	2½– 6	Same.

Soil	Map symbol	Management group [1]	Slope range	Natural drainage [2]	Permeability
			Percent		
Hollywood silty clay	HR	6	0– 2	Somewhat poor	Very slow
Hollywood silty clay, eroded undulating phase	HS	6	2– 4	Somewhat poor	Very slow
Holston fine sandy loam, undulating phase	HU	4	2– 6	Moderate	Moderate
Holston fine sandy loam, eroded undulating phase	HV	4	2– 6	Good	Moderate
Holston fine sandy loam, level phase	HT	4	0– 2	Good	Moderate
Humphreys silt loam	HX	2	0– 6	Moderately good	Moderately rapid
Humphreys cherty silt loam	HW	2	0– 6	Moderate	Moderately rapid
Huntington silt loam	HZ	1	0– 4	Good	Moderate
Huntington fine sandy loam	HY	1	0– 2	Somewhat excessive	Moderately rapid
Jefferson fine sandy loam, undulating phase	JE	4	2– 6	Good	Moderately rapid
Jefferson fine sandy loam, eroded undulating phase	JF	4	2– 6	Good	Moderately rapid
Jefferson fine sandy loam, eroded rolling phase	JG	11	6–12	Good	Moderately rapid
Jefferson stony fine sandy loam, eroded rolling phase	JH	11	6–12	Good	Moderately rapid
Lawrence silt loam	LA	6	0– 2	Somewhat poor	Slow
Lee silt loam	LE	14	0– 2	Poor	Moderately slow
Lee-Lobelville silt loams	LG	14	0– 2	Poor to somewhat poor	Moderately slow
Lee-Lobelville cherty silt loams	LF	14	0– 2	Same	Moderately slow
Lickdale silt loam	LH	14	0– 2	Poor	Moderately slow
Lindside silty clay loam	LK	1	0– 2	Somewhat poor	Moderate
Linker fine sandy loam, eroded undulating phase	LL	4	2– 5	Somewhat excessive	Moderately rapid
Made land		15a	2–12		
Melvin silty clay loam	ME	14	0– 2	Poor	Slow
Monongahela fine sandy loam	MO	6	0– 4	Somewhat poor	Slow
Muskingum fine sandy loam, hilly phase	MU	13	10–20	Somewhat excessive	Rapid
Muskingum stony fine sandy loam, hilly phase	MV	15a	10–20	Somewhat excessive	Rapid
Muskingum stony fine sandy loam, steep phase	MW	15a	20–45	Somewhat excessive	Rapid
Ooltewah silt loam	OP	1	0– 2	Somewhat poor	Moderate
Ooltewah fine sandy loam	OO	1	0– 2	Somewhat poor	Moderate
Pearman loam	PA	7	2– 5	Moderately good	Slow
Pits, clay	PC	15a			
Pits, gravel	PG	15a			
Prader fine sandy loam	PR	14	0– 2	Poor	Slow
Robertsville silt loam	RO	14	0– 2	Poor	Very slow
Rockland, limestone, steep	RS	15a	25+		
Rockland, limestone, hilly	RR	15a	12–25		
Rockland, limestone, rolling	RP	15a	2–12		
Sequatchie fine sandy loam	SE	2	0– 6	Good	Rapid
Sequatchie fine sandy loam, eroded phase	SF	2	2– 6	Good	Rapid
Stony colluvium, Jefferson and Colbert soil materials	ST	15	0– 3	Excessive	Very rapid
Stony rolling land, Talbott and Colbert soil materials	SV	15	6–12	Moderately good	Slow
Stony smooth land, Talbott and Colbert soil materials	SU	15	2– 6	Moderately good	Slow
Stony steep land, Muskingum soil material	SW	15a	10–45+	Excessive	Rapid

See footnotes at end of table.

the important characteristics of the soils—Continued

Surface soil color [3] [4]	Subsoil		Depth [5]	Parent rock or parent material
	Color [3]	Consistence [3]		
			Feet	
Dark grayish brown	Olive tinted very dark gray	Very firm	1– 5	Local alluvium from clayey limestone.
Dark grayish brown	Very dark gray, mottled in lower part.	Very firm	½– 4	Same.
Light yellowish brown	Yellowish brown to yellow	Firm	3–15	Old general alluvium from sandstone and shale; some limestone.
Light yellowish brown	Yellowish brown, mottled in lower part.	Firm	3–15	Same.
Pale brown or light brownish gray.	Yellowish brown to yellow	Firm	3–15	Same.
Yellowish brown	Dark yellowish brown	Moderately firm	4–20	Old general alluvium from cherty limestone.
Dark grayish brown to yellowish brown.	Dark yellowish brown, somewhat mottled.	Moderately firm	4–20	Same.
Dark brown to dark yellowish brown.	Same	Friable	5+	Young general alluvium chiefly from high-grade limestone.
Grayish brown to dark yellowish brown.	Yellowish brown to dark yellowish brown.	Moderately firm but friable.	5+	Young general alluvium from limestone, sandstone, and shale.
Pale brown	Yellowish brown	Friable to firm	3– 8	Old mixed colluvium from sandstone, shale, and limestone.
Brownish yellow	Yellowish brown	Moderately firm but friable.	3– 8	Same.
Brownish yellow	Yellowish brown	Moderately firm but friable.	2– 7	Same.
Brownish yellow	Yellowish brown	Moderately firm but friable.	2– 7	Same.
Light yellowish brown to pale brown.	Brownish yellow, mottled	Firm	15–40	Cherty limestone.
Grayish brown	Light gray, mottled	Friable	5+	Young general alluvium from cherty limestone.
Grayish brown to light brownish gray.	Mottled brownish gray, brownish yellow, yellowish brown, or yellowish red.	Friable	5+	Same.
Light brownish gray to grayish brown, faintly mottled.	Same	Friable to firm	5+	Same.
Dark grayish brown	Dark gray, faintly mottled	Friable	1½– 3	Sandstone, partly local alluvium.
Dark brown or dark grayish brown.	Mottled brown	Moderately firm	5+	Young general alluvium chiefly from high-grade limestone.
Grayish brown to light reddish brown.	Yellowish red	Friable to firm	3– 6	Sandstone and conglomerate residuum.
Grayish brown to dark grayish brown.	Light gray, mottled	Moderately friable	5+	Young general alluvium from high-grade limestone.
Light yellowish brown	Light yellowish brown to mottled.	Firm	4–15	Old general alluvium from sandstone, shale, and limestone mixed.
Grayish brown to light yellowish brown.	Light yellowish brown	Friable	1– 3	Sandstone.
Same	Light yellowish brown	Friable	0– 2½	Sandstone.
Same	Light yellowish brown	Friable	0– 2	Sandstone.
Brown to reddish brown	Brown, mottled	Friable	6+	Young local alluvium from limestone.
Grayish brown to reddish brown.	Brown, mottled	Friable	6+	Young local alluvium chiefly from limestone.
Light yellowish brown	Mottled yellowish brown	Very firm	2½– 4	Sandstone, shale, and limestone.
Pale brown	Gray, mottled with yellow, reddish yellow, and brown.	Friable to firm	4–20	Young mixed general alluvium from sandstone, limestone, and shale.
Grayish brown to light grayish brown.	Gray, mottled	Very firm	4–20	Old general alluvium chiefly from limestone.
			0– 1	Limestone.
			0– 1	Limestone.
			0– 1	Limestone.
Grayish brown	Yellowish red to reddish brown.	Friable to firm	5–20	Moderately old general alluvium, chiefly from sandstone.
Grayish brown	Same	Friable to firm	4–20	Same.
Grayish brown	Brownish yellow	Friable	3–10	Young colluvium, chiefly from sandstone, and local alluvium.
Pale yellow or yellowish brown to reddish yellow.	Yellowish brown to yellowish red grading to mottled.	Very firm	0– 2	Clayey limestone.
Same	Same	Very firm	0– 2	Clayey limestone.
Grayish brown	Light yellowish brown	Friable	0– 1½	Sandstone.

Soil	Map symbol	Management group [1]	Slope range	Natural drainage [2]	Permeability
			Percent		
Taft silt loam	TA	6	0–2	Somewhat poor	Slow
Talbott silty clay loam, eroded undulating phase	TC	7	2–6	Moderately good	Slow
Talbott silty clay loam, eroded rolling phase	TH	10	6–12	Moderately good	Slow
Talbott cherty silty clay loam, eroded undulating phase	TB	7	2–6	Moderately good	Slow
Talbott cherty silty clay loam, eroded rolling phase	TC	10	6–12	Moderately good	Slow
Talbott cherty silty clay, severely eroded rolling phase	TD	12	6–12	Moderately good	Slow
Talbott fine sandy loam, eroded undulating phase	TE	7	2–6	Moderately good	Slow
Talbott fine sandy loam, eroded rolling phase	TF	10	6–12	Moderately good	Slow
Talbott-Colbert cherty silty clay loams, eroded hilly phases.	TK	13	12–25	Moderately good	Slow
Tupelo silt loam	TU	6	0–2	Somewhat poor	Slow
Tupelo silt loam, overwash phase	TV	6	0–2	Somewhat poor	Slow
Tyler very fine sandy loam	TY	14	0–2	Poor	Very slow
Wolftever silt loam	WO	2	0–4	Moderately good	Moderately slow
Wolftever silt loam, eroded phase	WP	2	2–4	Moderately good	Moderately slow

[1] Groups discussed in the section on Use and Management of Soils.
[2] Equivalent to drainage classes in Soil Survey Manual (7).
[3] Moderately moist.
[4] Applies to the 5- or 6-inch plow layer in the eroded and severely eroded phases.
[5] Depth to bedrock or to distinctly different material such as a bed of gravel.

the important characteristics of the soils—Continued

Surface soil color [3 4]	Subsoil		Depth [5]	Parent rock or parent material
	Color [3]	Consistence [3]		
			Feet	
Light yellowish brown	Brownish yellow, mottled	Friable to firm	4–20	Old general alluvium chiefly from limestone.
Brown to light reddish brown.	Yellowish red	Very firm	2– 6	Clayey limestone.
Yellowish red to reddish brown.	Reddish brown	Very firm	1½– 5	Clayey limestone.
Pale brown to light reddish brown.	Reddish brown to reddish yellow.	Very firm	2– 6	Cherty clayey limestone.
Reddish brown	Yellowish red	Very firm	1½– 5	Cherty clayey limestone.
Yellowish red to reddish brown.	Yellowish red to reddish brown, mottled.	Very firm	1– 4	Cherty clayey limestone.
Light brown to light reddish brown.	Yellowish red grading to mottled.	Very firm	2– 6	Thin alluvium over clayey limestone residuum.
Same	Same	Very firm	1½– 5	Same.
Yellowish red to yellowish brown.	Yellowish red, reddish brown, or yellowish brown.	Very firm	½– 3	Cherty clayey limestone.
Light gray to pale brown	Yellowish brown, yellowish gray, and reddish brown, strongly mottled.	Very firm	5– 7	Moderately old alluvium from clayey limestone; in places some shale and sandstone.
Brown to light gray	Light gray to pale brown, faintly mottled.	Firm to very firm	5– 7	Same.
Pale brown	Light gray, mottled	Firm	4–20	Old mixed general alluvium from sandstone, shale, and limestone.
Grayish brown to brown	Yellowish brown to mottled	Very firm	10–40	Moderately old general alluvium chiefly from limestone, some shale and sandstone.
Grayish brown to yellowish brown.	Same	Very firm	10–40	Same.

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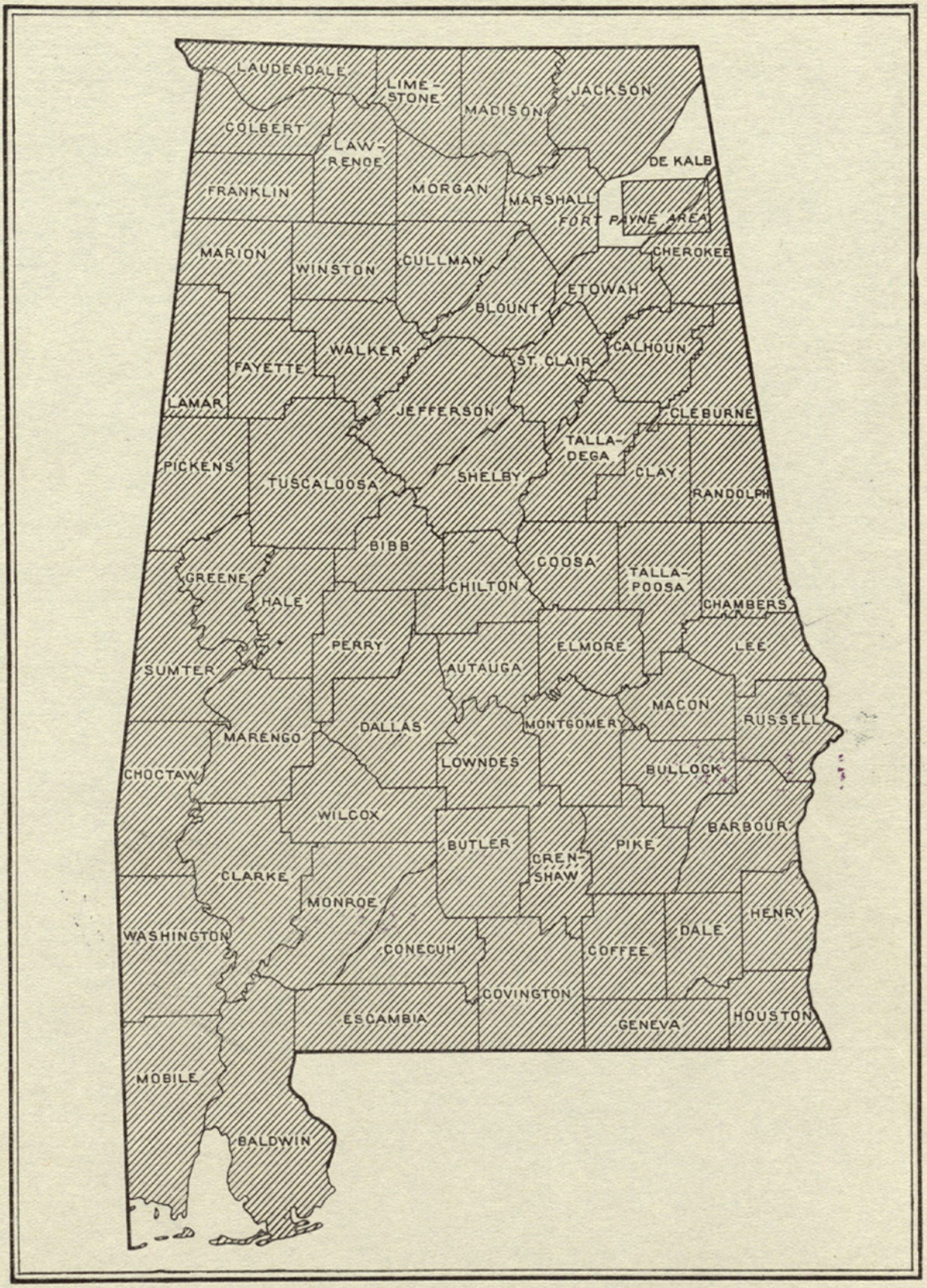

Areas surveyed in Alabama shown by shading.

SOIL ASSOCIATIONS
MADISON COUNTY, ALABAMA

1 Decatur - Cumberland - Abernathy	6 Hermitage - Talbott - Colbert
2 Dickson - Lawrence	7 Baxter - Cookeville - Dewey
3 Hartsells - Muskingum	8 Hunting - Lindside - Hamblen
4 Allen - Jefferson	9 Rough stony land
5 Holston - Tupelo - Robertsville	

U.S. DEPARTMENT OF AGRICULTURE

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INDEX TO MAP SHEETS
MADISON COUNTY, ALABAMA

Scale 1:126,720

1 0 1 2 3 4 Miles

1 0 3 6 Km

DATE: 8 MAY 1981
PUBLICATION SCALE 1:24,000
FORMAT 7.5′ X 7.5′

Base prepared by the State of Alabama Highway Department, Bureau of Planning and Programming - Surveying and Mapping Division.

In cooperation with the U.S. Department of Transportation, Federal Highway Administration.

Control by National Ocean Survey and Alabama Highway Department, Transverse Mercator Projection. 1927 North American Datum. 10,000 foot grid based on Alabama East rectangular coordinate system.

USDA-SCS-FORT WORTH, TEXAS 1984

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SHEET NUMBER 1
MADISON COUNTY, ALABAMA

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5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

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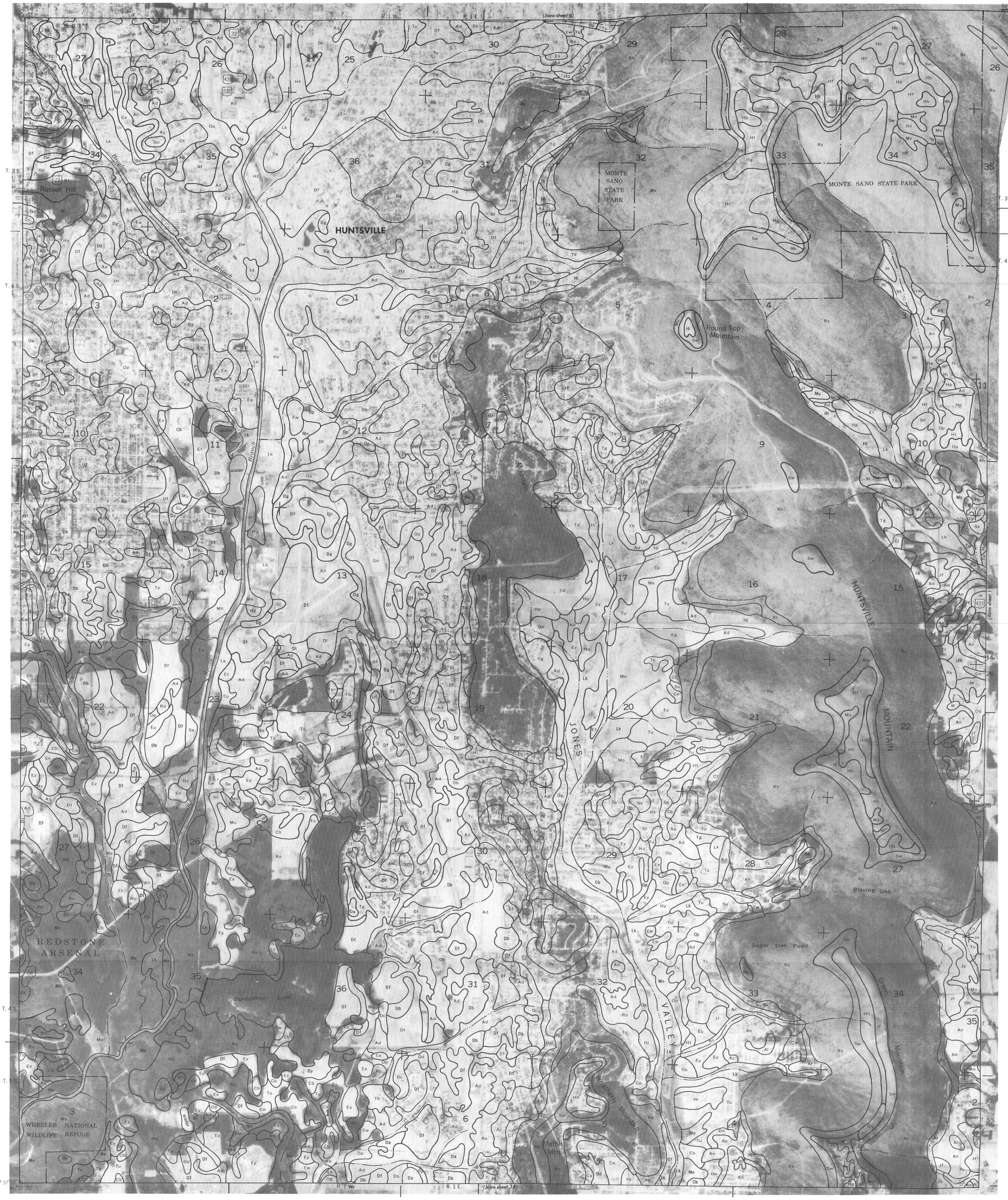
SHEET NUMBER 10
MADISON COUNTY, ALABAMA



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SHEET NO. 10 OF 16

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SHEET NUMBER 11
MADISON COUNTY, ALABAMA

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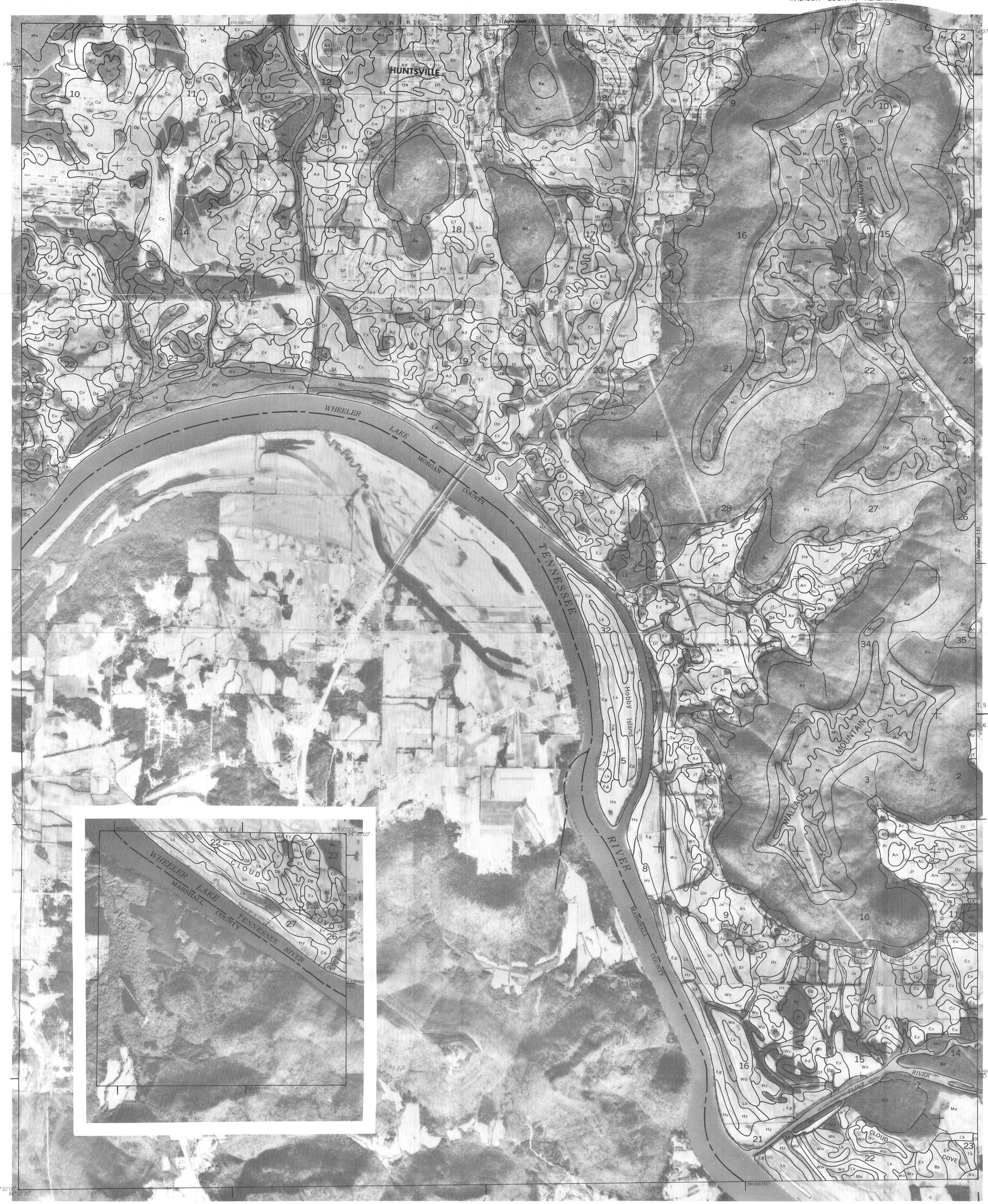

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SHEET NO. 15 OF 16

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SHEET NUMBER 4
MADISON COUNTY, ALABAMA

340 000 FEET

86° 15'00"
35°00'00"

1 630 000 FEET

LINCOLN COUNTY TENNESSEE

FRANKLIN COUNTY TENNESSEE

Hale Mountain

Creek

Dry Fork

Mountain Fork

Rocky Branch

Bee Branch

JACKSON COUNTY

BACKBONE MOUNTAIN

Lickskillet Creek

Hurricane Creek

(Joins sheet 3)

(Joins sheet 8)

1 600 000 FEET

370 000 FEET

34° 52'30"
86° 22'30"

T. 1 S.
T. 2 S.

R. 2 E.
R. 3 E.

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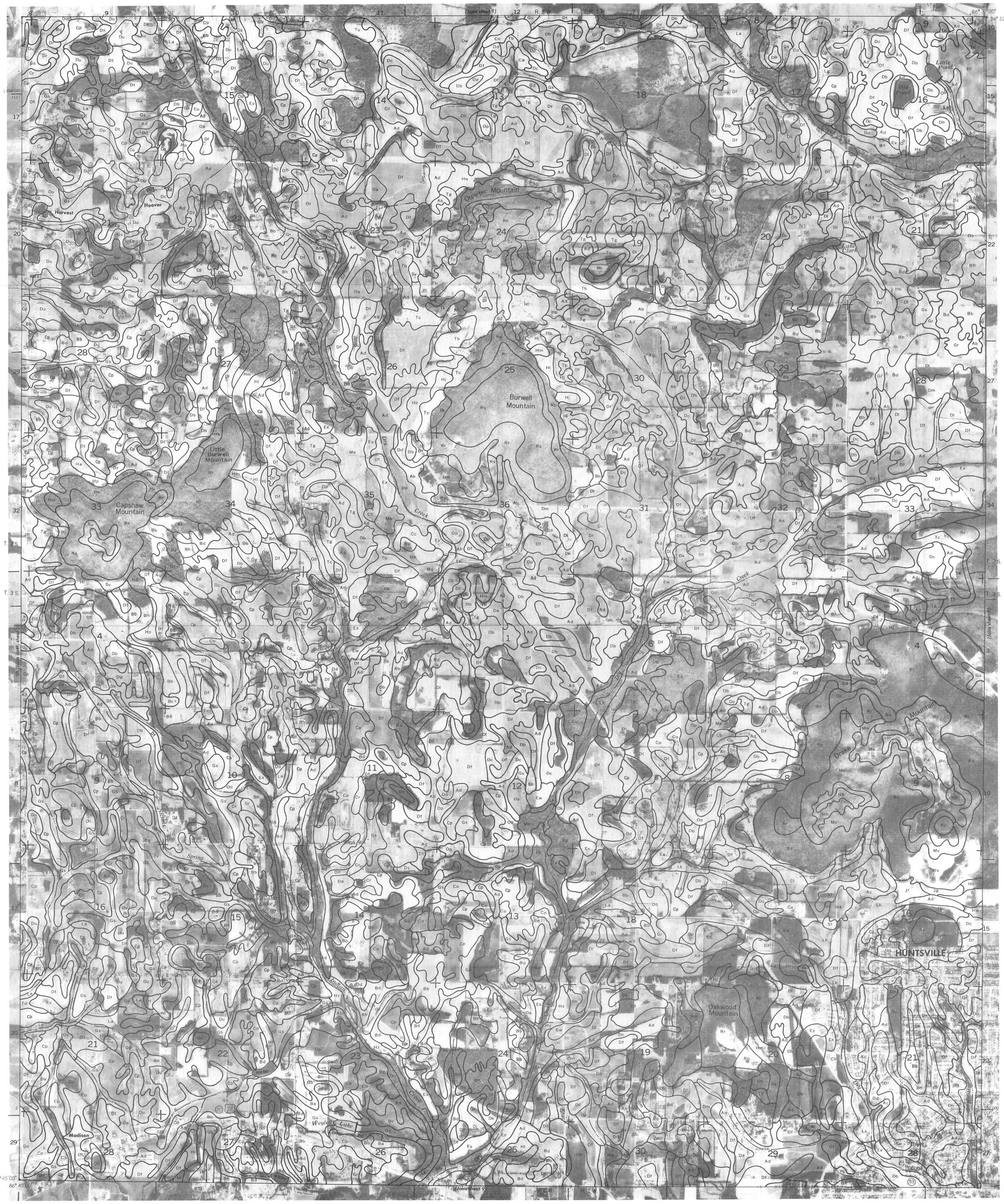
SHEET NO. 4 OF 16



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MADISON COUNTY, ALABAMA

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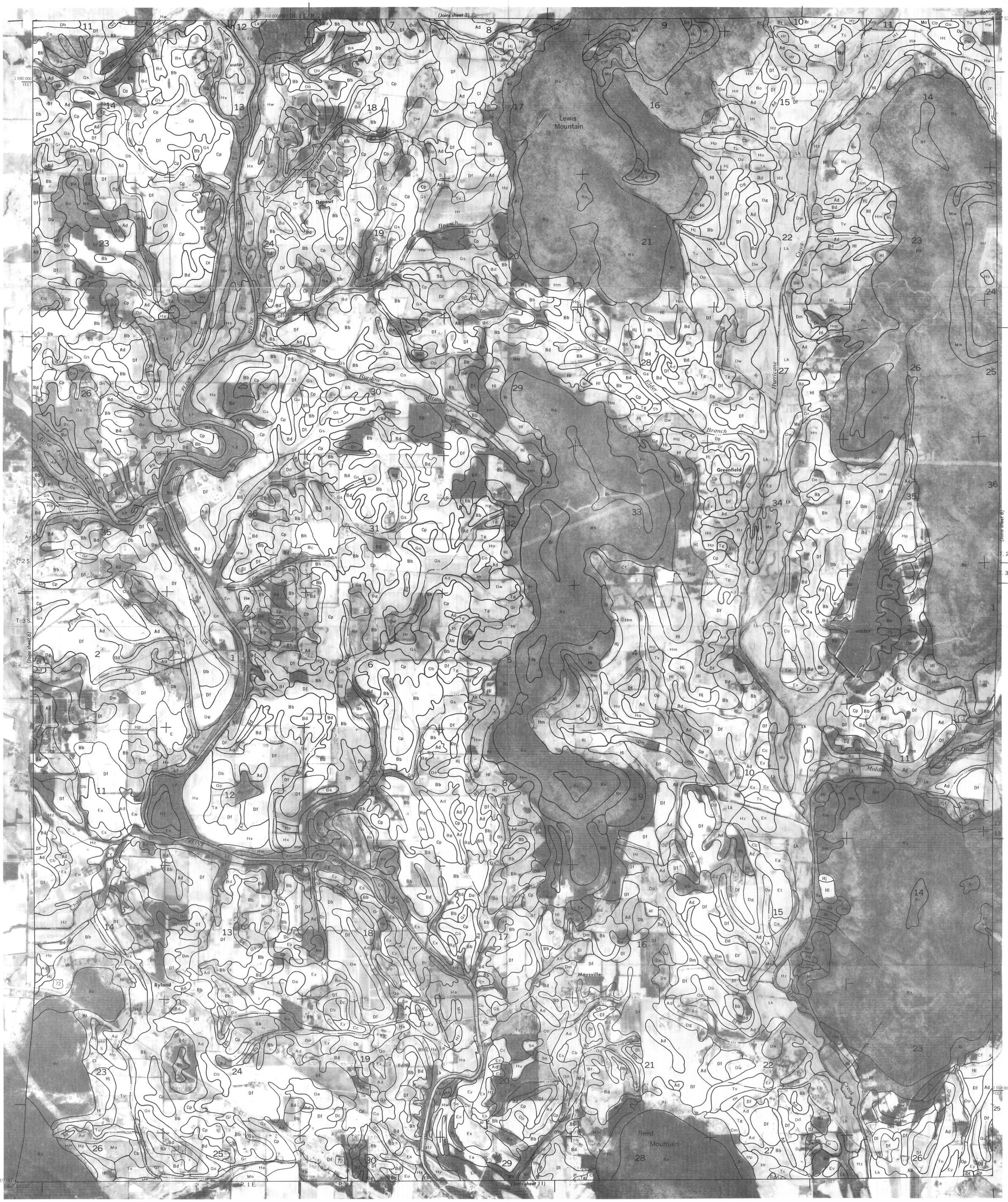

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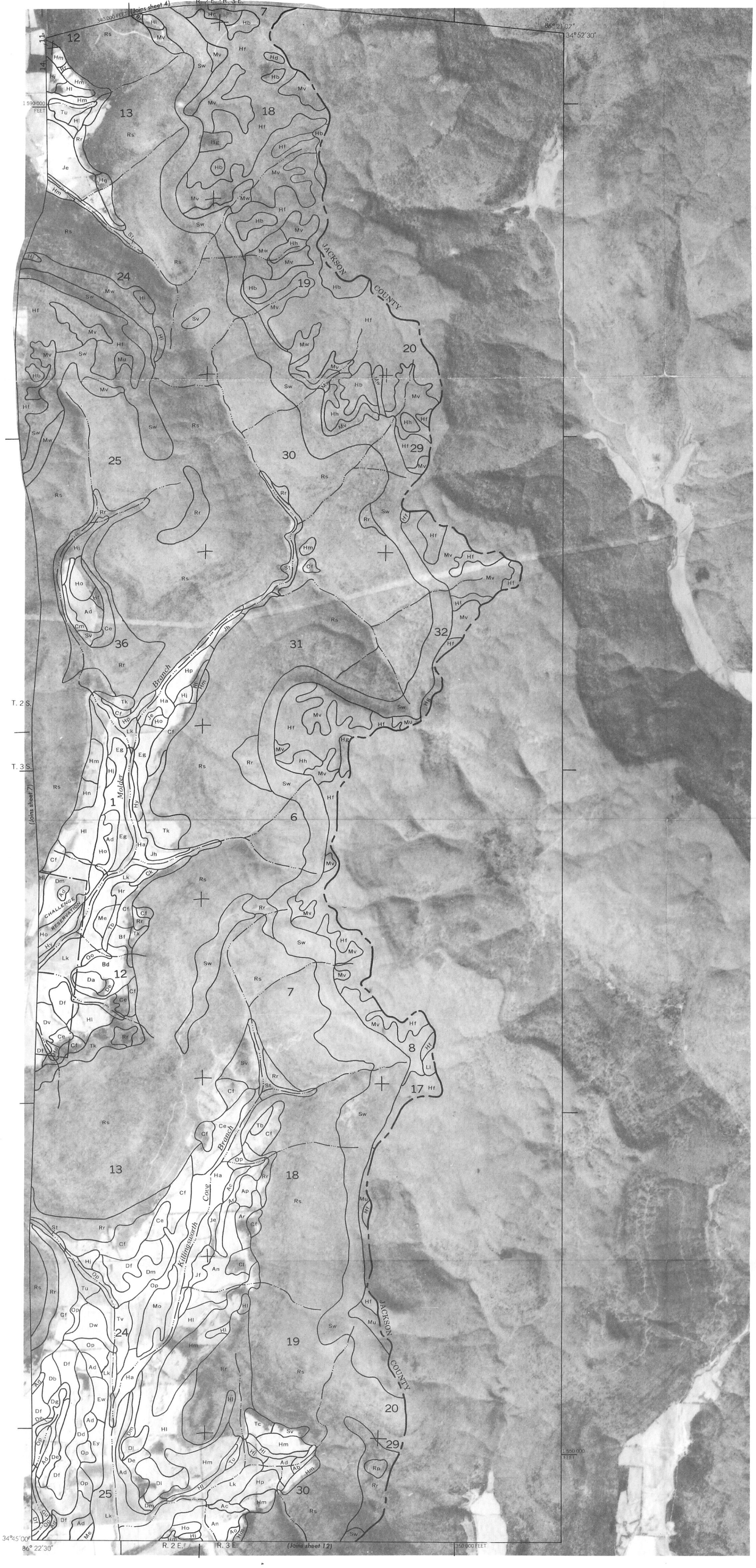
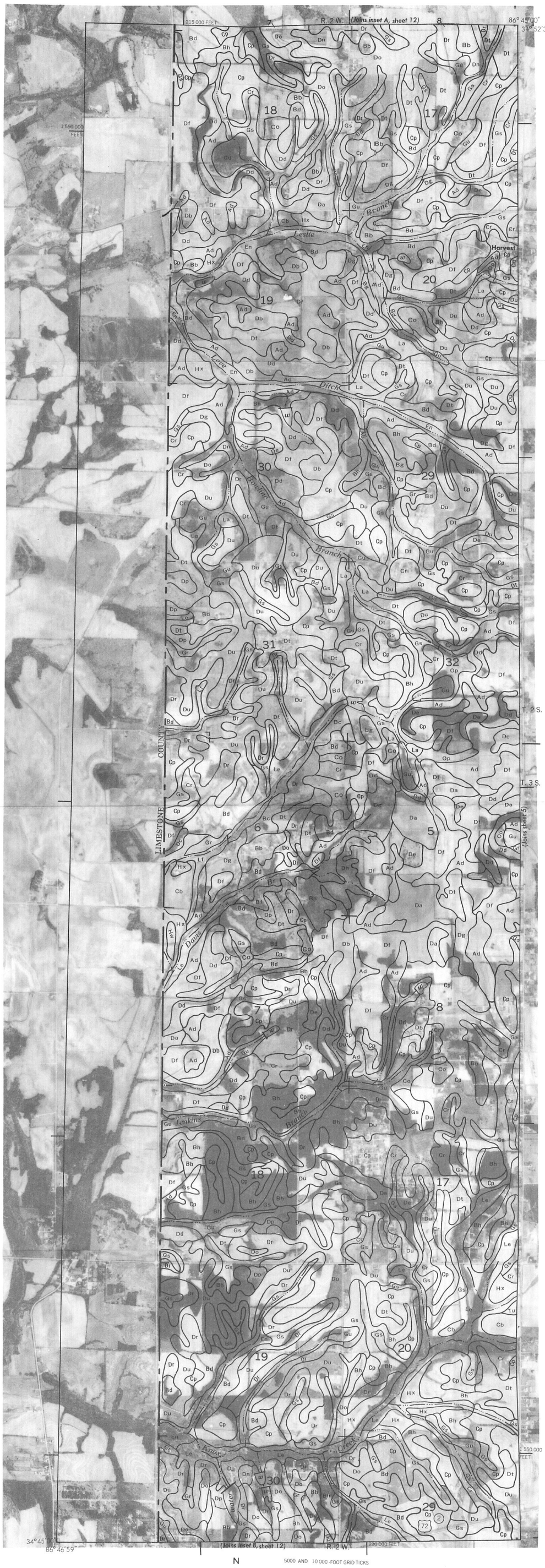
MADISON COUNTY, ALABAMA





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5000 AND 10 000-FOOT GRID TICKS

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MADISON COUNTY, ALABAMA

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1 .5 0 1 2 3 Kilometers
Scale - 1:24000

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